

Overview of Results Manual (Volume 2): Purpose, Content, and Structure

Purpose

This results manual is a companion to the technical quality manual (volume 1). The first volume describes the technical quality evaluation framework and provides a description of the comprehensive and detailed procedural evidence that supports the validity of the NH PACE Innovative Assessment and Accountability System results.

The purpose of this document is to provide the analytic details and reports for the analyses described in volume 1. This document is replicated each year of the Innovative Assessment Demonstration Authority (IADA) with results from that specific year. The results in this manual are from the 2018-2019 school year—NH PACE’s IADA Year 1.

Content

This manual explains the results used to evaluate the technical quality of the NH PACE Innovative Assessment and Accountability System during the 2018-2019 school year. The manual provides results focused on two dimensions of the technical quality evaluation framework detailed in volume 1: (a) defensible standard setting methods and results; and (b) extensive comparability analyses and evaluation.

Structure

This manual is organized according to the framework category and relationship to the description of the evaluation in the volume 1 manual.¹

Framework Category	Evaluating Technical Quality (Volume 1): Manual	Evaluating technical Quality (Volume 2): Results for 2018-2019 School Year	Pages Numbers
Defensible standard setting methods and results	Contrasting Groups Standard Setting Method	PACE 2019 Standard Setting Report	Pages 42-375
	Quality Control Processes and Procedures		
	Cut Score Calculation Business Rules		
	Application of Cut Score Calculation Business Rules		
	Quality Assurance Processes and Procedures		
	Performance Standards Validation	PACE 2019 Body of Work Standards Validation Report	Pages 37-41
Extensive Comparability Analyses and Evaluation	Level 1: Within-District Comparability in Expectations for Student Performance	PACE 2019 Inter-Rater Reliability Analysis Report	Pages 4-9
	Level 2: Cross-District Comparability in Expectations of Student Performance	PACE 2019 Cross-District Comparability Analyses Report	Pages 10-20
	Level 3: Across Assessment System Comparability of Annual Determinations	PACE 2019 Concurrent and Non-Concurrent Validity Analyses Report	Pages 21-36

¹ Note: Each report in this manual starts table and figure numbers from 1.

PACE 2019 Inter-Rater Reliability Analysis Report

The purpose of analyzing the inter-rater reliability on the PACE common performance tasks is so that we may make judgments about the degree of score consistency within a district. Score consistency within a district is foundational to inferences about score consistency (or comparability) across districts. Due to the human judgment involved in the scoring process for the PACE common performance tasks, reliability must be examined through inter-rater reliability estimates rather than traditional reliability estimates such as coefficient alpha. To assess this kind of scoring consistency, all participating PACE districts were asked to have a sample of student work on the PACE common performance tasks scored by two teachers independently, thereby producing double-scores for a sample of students.

After the data were cleaned, compiled and sorted, there were a total of 1,683 double-scores included in the inter-rater reliability analysis for grades 4-7 ELA, grades 3, 5-7 Math, and grade 8 science. The submitted double scores are broken down by grade, subject, and district in Table 1 below. Monroe did not submit double scores because they have only one teacher per grade in their district.

Table 1
Number of Double Scores by Grade, Subject, and District

Grade	Frequency	Subject	Frequency	District	Frequency
3	203	ELA	782	Amherst	141
4	197	Math	759	Concord	220
5	437	Science	142	Epping	178
6	402	Total	1683	Laconia	80
7	302			Newport	181
8	142			Rochester	172
Total	1683			Sanborn	180
				SAU23	88
				SAU35	68
				SAU9	120
				Seacoast	255
					1683

For this report, inter-rater reliability is examined using two statistical indicators: percent agreement and Cohen’s Kappa. Two indicators are used because each statistic provides unique information that is useful for making judgments about the degree of score reliability.

Percent Agreement

First, we report percent agreement on each rubric dimension by subject and grade (Table 2.1). As per the March 1, 2016 PACE Progress Report to the USDOE, the target set for rater consistency is a 60% exact agreement rate for each dimension on the PACE Common Tasks. Exact agreement rates that did not meet this target are highlighted in red below. Scores on each rubric dimension were compared across raters by subject and grade to examine inter-rater consistency. Then, the percentage of cases where the dimension score is the same across raters was calculated by subject and grade from all districts to represent the “percent exact” match. The dimension scores that were different only by one-point fall into the “percent adjacent” category. This analysis reveals a strong degree of agreement when all data is analyzed together—about 99% of all double scores fall into either the exact or adjacent categories. Grade 8 science had one rubric dimension that did not meet the 60% exact agreement threshold (RD5 %Exact=52.44).

Table 2.1

Percent Exact Agreement & Adjacent for Each Rubric Dimension by Subject and Grade for All Districts

	RD1		RD2		RD3		RD4		RD5	
Grade	%Exact	%Adjacent								
ELA										
4	76.14	23.35	77.66	22.34	71.07	28.43	70.05	28.43	--	--
5	68.18	30.91	70.91	26.36	68.18	30.91	73.18	25.00	--	--
6	72.41	26.60	81.77	17.24	80.30	18.72	72.91	25.62	--	--
7	64.81	32.72	61.11	37.04	62.96	35.80	65.43	33.95	--	--
Math										
3	72.41	25.62	74.88	23.15	71.92	27.09	--	--	--	--
5	75.58	21.66	78.34	21.20	76.96	21.66	--	--	--	--
6	78.89	20.60	69.19	29.80	73.37	24.12	--	--	--	--
7	82.86	16.43	84.17	15.83	71.74	25.36	78.42	20.86	81.29	17.27
Sci										
8	68.31	30.99	69.72	30.28	65.49	33.80	64.63	32.93	52.44	43.90

Second, we report inter-rater consistency by district and subject (Table 2.2). Scores on each rubric dimension were compared across raters for each district, grade and subject combination. Then an average of the percent exact and percent adjacent for each district and subject was calculated. This analysis reveals a strong degree of agreement for each district by subject, although Rochester and SAU23 appear to have lower rates of agreement (<60% exact) in several subjects. This is likely due to the way in which inter-rater reliability data was collected for these two districts in the 2018-19 school year. These two districts were the only ones who piloted a different approach to submitting within-district double scoring in the 2018-19 school year. Instead of submitting double scoring data after within-district calibration sessions occurred during the school year, both of these districts sent enough teachers to the PACE Summer

Institute so that another teacher from the district could double score the submitted work samples in July 2019. This means that teachers were not able to calibrate with their colleagues prior to double scoring and the double scoring took place after the school year ended, which likely explains the lower than expected percent exact agreement rates for these two districts. Given this data from the double scoring pilot, we will revise our data collection protocols in the 2019-20 school year so that double scoring data is collected after calibration sessions within districts during the school year.

Table 2.2
Percent Exact Agreement & Adjacent by District and Subject

District	Subject	N	%Exact	%Adj
Amherst	ELA	60	72.08	27.08
	Math	61	79.89	19.13
	Science	20	81.67	18.33
Concord	ELA	101	76.49	23.27
	Math	96	77.64	21.39
	Science	23	73.91	26.09
Epping	ELA	80	66.88	32.81
	Math	78	80.11	19.89
	Science	20	56.00	44.00
Laconia	ELA	40	68.75	30.63
	Math	40	68.33	31.67
Newport	ELA	81	75.93	24.07
	Math	80	70.42	28.33
	Science	20	76.67	23.33
Rochester	ELA	75	55.00	38.00
	Math	78	60.34	34.70
	Science	19	54.74	40.00
SAU23	ELA	53	53.30	43.40
	Math	35	50.48	41.90
SAU35	ELA	34	81.62	18.38
	Math	34	84.31	15.69
SAU9	ELA	60	65.42	33.33
	Math	60	77.22	22.78
Sanborn	ELA	80	79.69	19.69
	Math	80	85.41	13.50
	Science	20	48.00	50.00
Seacoast	ELA	118	80.72	19.28
	Math	117	82.39	16.75
	Science	20	81.67	18.33

Cohen's Kappa

In addition to percent agreement, Cohen's Kappa is another way to evaluate inter-rater reliability. The reason that Cohen's Kappa is useful over and above the percent agreement measures is because it takes into account the possibility that two raters may arrive at the same score by chance alone. Cohen's Kappa is calculated using the following formula:

$$K = \frac{\text{Pr}(a) - \text{Pr}(e)}{1 - \text{Pr}(e)}$$

where Pr(a) is observed agreement and Pr(e) is the probability of chance agreement. Table 3.1 shows the individual Kappa estimates for each rubric dimension by subject and grade across districts. Values can be interpreted in the following way: 0-.2 slight agreement, .21-.40 fair agreement, .41-.60 moderate agreement, .61-.80 substantial agreement, and 0.81-.1 represents almost perfect agreement. Any Kappa estimate lower than moderate agreement (0.41) is highlighted in red. Most Kappa estimates are in the moderate to substantial agreement range. As expected based on the percent exact agreement rates, Grade 8 science has a Kappa estimate slightly lower than the rest.

Table 3.1

Cohen's Kappa for Each Rubric Dimension by Subject and Grade for All Districts

Subject	Grade	RD1 Kappa	RD2 Kappa	RD3 Kappa	RD4 Kappa	RD5 Kappa
ELA	4	0.650	0.651	0.575	0.529	
	5	0.461	0.543	0.463	0.566	
	6	0.584	0.725	0.708	0.602	
	7	0.474	0.417	0.444	0.470	
Math	3	0.601	0.649	0.580		
	5	0.642	0.653	0.647		
	6	0.700	0.580	0.606		
	7	0.765	0.780	0.620	0.703	0.752
Science	8	0.533	0.552	0.514	0.485	0.349

Table 3.2 below shows the individual Kappa estimates for each rubric dimension by district and subject. Any Kappa estimate lower than moderate agreement (0.41) is highlighted in red. As expected based the percent exact agreement analysis, Rochester and SAU 23 have numerous rubric dimensions with Kappa estimates lower than moderate agreement. There also appears to be lower than expected Kappa estimates in science on some rubric dimensions in Epping and Sanborn.

Table 3.2
Cohen's Kappa for each Rubric Dimension by District and Subject

District	Subject	N	RD1 Kappa	RD2 Kappa	RD3 Kappa	RD4 Kappa	RD5 Kappa
Amherst	ELA	60	0.510	0.482	0.600	0.641	
	Math	61	0.730	0.814	0.656	0.576	0.663
	Science	20	0.791	0.775	0.648		
Concord	ELA	101	0.573	0.671	0.653	0.618	
	Math	96	0.707	0.634	0.607	0.355	0.856
	Science	23	0.465	0.406	0.469	0.652	0.605
Epping	ELA	80	0.444	0.547	0.482	0.528	
	Math	78	0.820	0.689	0.669	1.000	0.714
	Science	20	0.505	0.341	0.420	0.170	0.338
Laconia	ELA	40	0.437	0.605	0.472	0.429	
	Math	40	0.345	0.581	0.649		
Newport	ELA	81	0.572	0.652	0.615	0.592	
	Math	80	0.674	0.606	0.466	1.000	1.000
	Science	20	0.583	0.715	0.662		
Rochester	ELA	75	0.332	0.379	0.347	0.373	
	Math	78	0.477	0.507	0.382	0.662	0.725
	Science	19	0.308	0.506	0.275	0.533	0.078
SAU23	ELA	53	0.263	0.326	0.272	0.206	
	Math	35	0.419	0.254	0.182		
SAU35	ELA	34	0.708	0.712	0.784	0.640	
	Math	34	0.863	0.702	0.667		

SAU9	ELA	60	0.348	0.685	0.428	0.396	
	Math	60	0.576	0.682	0.651		
Sanborn	ELA	80	0.836	0.717	0.684	0.540	
	Math	80	0.818	0.750	0.842	0.417	0.437
	Science	20	0.055	0.240	0.176	0.516	0.247
Seacoast	ELA	118	0.722	0.625	0.621	0.757	
	Math	117	0.718	0.759	0.736	0.661	0.779
	Science	20	0.776	0.669	0.695		

Conclusion

Overall, this analysis reveals acceptable rates of inter-rater reliability within districts based upon the purpose and use of scores from the PACE common task within the PACE innovative system. It is clear from the results for Rochester and SAU23, however, that double scoring outside of the school year and without calibration sessions does not produce acceptable rates of inter-rater reliability. Adjustments to data collection protocols in the 2019-20 school year should address those issues.

PACE Cross-District Comparability Analyses Report

In order to account for differences in the relative stringency and leniency in teacher scoring across the PACE districts, the PACE innovative assessment system uses common performance tasks across districts. These common tasks allow us to evaluate the degree of comparability in local scoring. These analyses rest on two foundational assumptions: 1) that patterns in scoring for the common tasks is representative of district relative stringency or leniency of local scoring represented in end of year competency scores, and 2) the degree of relative stringency or leniency of scoring is consistent within district for a particular grade and subject area.

Cross-District Calibration Audit

The calibration audit is intended to uncover differences in scoring between districts that can be used to support decision-making about any adjustments to cut scores that may be needed due to systematic cross-district differences in scoring, which violates one of the foundational assumptions noted above. The scores of student work on PACE performance tasks that result from this audit serves as the “calibration weights” so that more generalized inferences about relative leniency or stringency of district scoring practices can be made.

On July 16, 2019, teachers and leaders from the PACE districts participated in the calibration audit. We also conducted online, distributed scoring of the calibration audit ahead of the July in-person event with approximately 40 teachers from across PACE districts who participated. Participating teachers volunteered based upon their experience in attending the in-person calibration event in the past.

The calibration audit uses a consensus scoring method that involves pairing teachers together, each representing different districts, to score student work samples. The student work samples were gathered for each of the PACE common performance tasks from the districts participating in the 2018-19 school year. Both judges within each pair were asked to individually score their assigned samples of student work. Working through the work samples one at a time, the judges discussed their individual scores and then agreed on a “consensus score”. If consensus could not be reached, an expert scorer (who did not have affiliation with any particular district) decided on the appropriate consensus score. There were five cases in math and one case in ELA this year where an expert scorer was needed to moderate one rubric dimension.

Cross-District Comparability Results

An average across the rubric dimensions from the consensus scorers was matched with an average across the rubric dimensions from the teacher-given local scores using Student ID, district, grade, and subject. This matching resulted in 1,493 total students with both consensus scores and local scores for the common task in grades 3-7. High school is not included because federally-required high school annual determinations in New Hampshire are supplied by students’ scores on the SAT. The distribution of these students across grades, subjects, and

district is provided in the table on the next page. There are some cells with very few students ($N < 10$) because these districts have small student populations. This causes challenges for our ability to evaluate comparability with any degree of precision. Due to data issues, the grade 8 science results are still pending.

Table 6.

Number of Matched Students by Grade, Subject, and District

Subj	Gr	Amherst	Bethlehem	Concord	Conway	Epping	Laconia	Monroe	Newport	Rochester	Sanborn	SAU23	Seacoast	Total
ELA	4	NA	13	19	18	20	13	4	20	17	20	19	20	183
	5	20	20	10	17	20	19	6	20	20	19	17	19	207
	6	18	15	20	20	20	NA	6	19	20	20	16	20	194
	7	19	NA	23	NA	20	NA	*	24	20	19	14	17	156
Math	3	NA	9	19	20	20	20	11	21	21	19	20	19	199
	5	21	20	22	20	20	*	2	20	20	20	13	19	197
	6	20	15	17	20	20	NA	6	19	20	20	20	20	197
	7	20	NA	22	NA	19	NA	8	19	20	19	13	20	160
Total		118	92	152	115	159	52	43	162	158	156	132	154	1493

Note. NA=district is not participating in NH PACE in that grade/subject. *Data issue. Cannot calculate analyses.

To detect any systematic discrepancies in the relatively leniency and stringency of district scoring, we calculated a mean deviation index. This index is the mean difference between the consensus score and teacher local score across all student work samples for each district as calculated by the following, for District k:

$$Deviation_k = \frac{\sum_i^n (teacher_i - consensus_i)}{n_k}$$

Using this index, a negative mean deviation would indicate systematic underestimation of student scores by classroom teachers (i.e., district stringency), and positive mean deviation scores would indicate systematic overestimation of student scores by classroom teachers (i.e., district leniency). The values of the deviation metric are on the scale of the rubric points. Table 7 below shows the mean observed deviation by district.

Table 7.
Mean deviation by district along with other descriptive statistics

	N	Mean Deviation	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Amherst	118	0.3302	0.63457	0.05842	0.2145	0.4459	-1.25	2.33
Bethlehem	92	0.1911	0.66235	0.06905	0.0539	0.3282	-1.00	2.00
Concord	152	0.1293	0.55574	0.04508	0.0402	0.2183	-1.50	2.00
Conway	115	0.1453	0.62268	0.05806	0.0302	0.2603	-1.00	2.00
Epping	159	0.0736	0.52287	0.04147	-0.0083	0.1555	-1.33	2.00
Laconia	52	-0.0706	0.44798	0.06212	-0.1953	0.0541	-1.00	1.00
Monroe	43	0.3961	0.56340	0.08592	0.2227	0.5695	-1.20	2.00
Newport	162	0.3103	0.51905	0.04078	0.2298	0.3908	-1.00	1.66
Rochester	158	0.1654	0.57338	0.04562	0.0753	0.2555	-1.50	2.00
Sanborn	156	0.1922	0.59142	0.04735	0.0986	0.2857	-1.25	2.50
SAU23	132	0.4079	0.54083	0.04707	0.3148	0.5010	-1.40	1.66
Seacoast	154	0.1052	0.51312	0.04135	0.0235	0.1869	-1.33	1.67
Total	1493	0.1972	0.57472	0.01487	0.1680	0.2264	-1.50	2.50

Positive scores indicate a systematic overestimation of common task scores by the classroom teachers. If they are all high it is not necessarily problematic from a comparability perspective, we are just looking for differences among the districts in mean deviation. Figure 1 uses a boxplot to illustrate these differences in mean deviation by district.

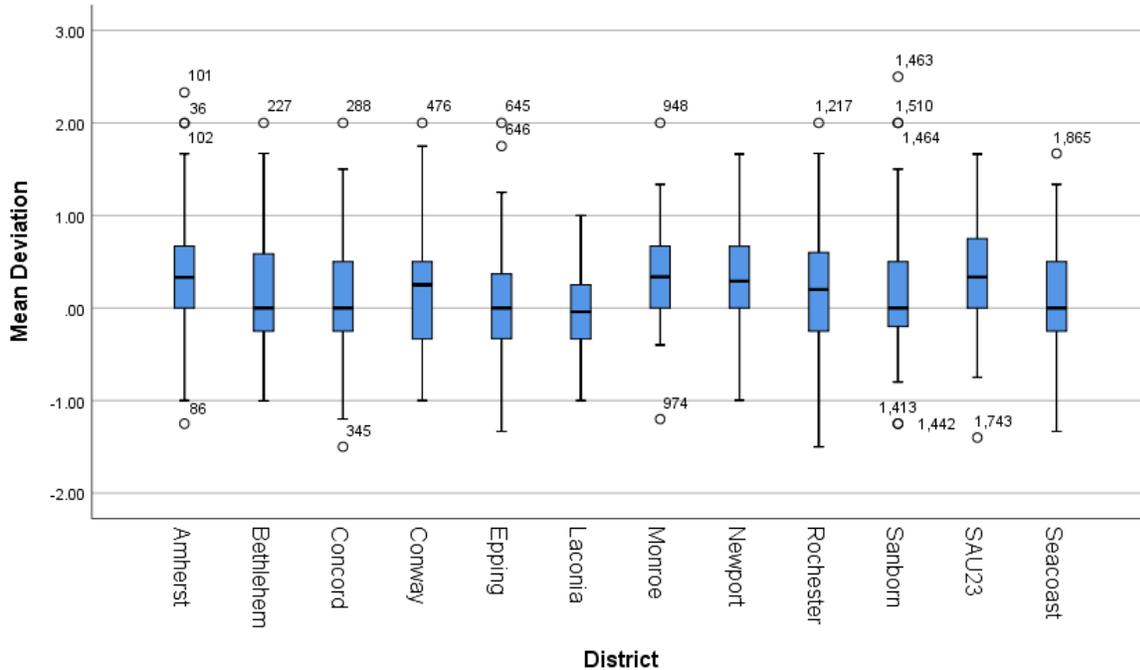


Figure 1. Boxplot illustrating mean deviation by district (SAU)

SAU23 has a mean deviation score slightly higher than the other districts (0.40), which means that teachers from that district tended to score more leniently than teachers from other districts. Post-hoc analyses with a Bonferroni correction revealed that SAU23’s marginal deviations are significantly different at the 0.05-alpha level from six other districts and is flagged for further review.

A three-factor analysis of variance reveals a significant 3-way interaction for district, by grade, by subject combinations (see Table 8). This means we cannot justify any unilateral adjustments to any one districts’ cut scores across the board. Instead, more nuanced decisions must be made based on follow-up analyses.

Table 8.
ANOVA – District by grade by subject

Source	df	F	Sig.	Partial Eta Squared
District	11	8.031	0.000	0.059
Grade	4	10.048	0.000	0.028
Subject	1	0.530	0.467	0.000
District*Grade	37	6.702	0.000	0.150
District*Subject	10	4.662	0.000	0.032
Grade*Subject	2	1.320	0.267	0.002
District*Subject*Grade	17	3.872	0.000	0.045

Figures 2-3 below show plots of the mean deviations by district and grade for ELA and math, respectively. The numbers represented in those plots can be found in Table 10 (by district, subject and grade).

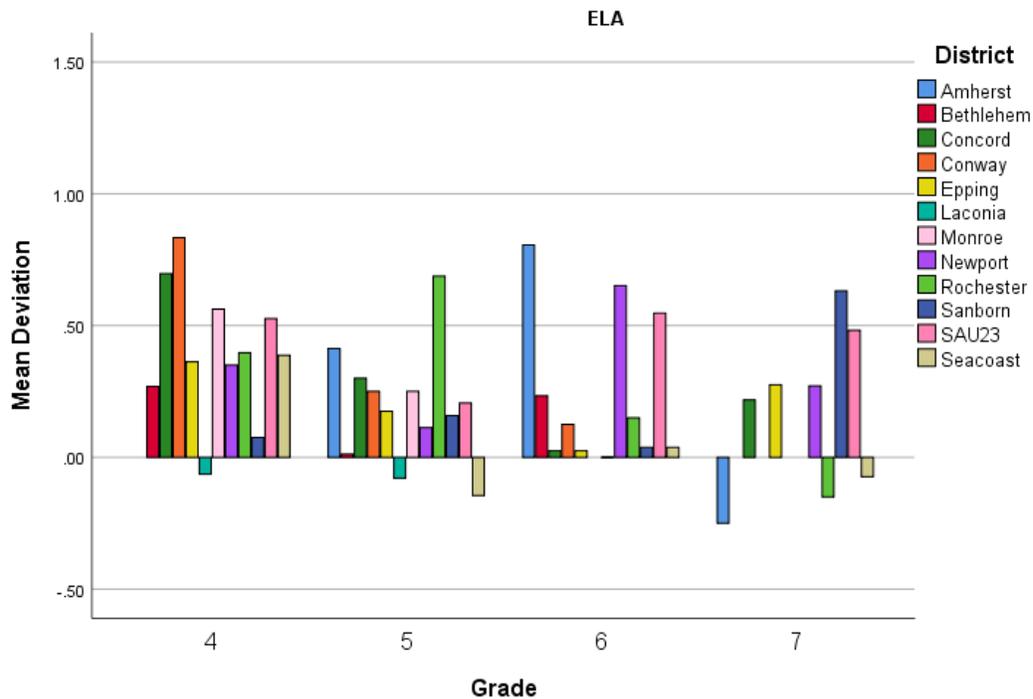


Figure 2. Mean Deviations by District and Grade for ELA

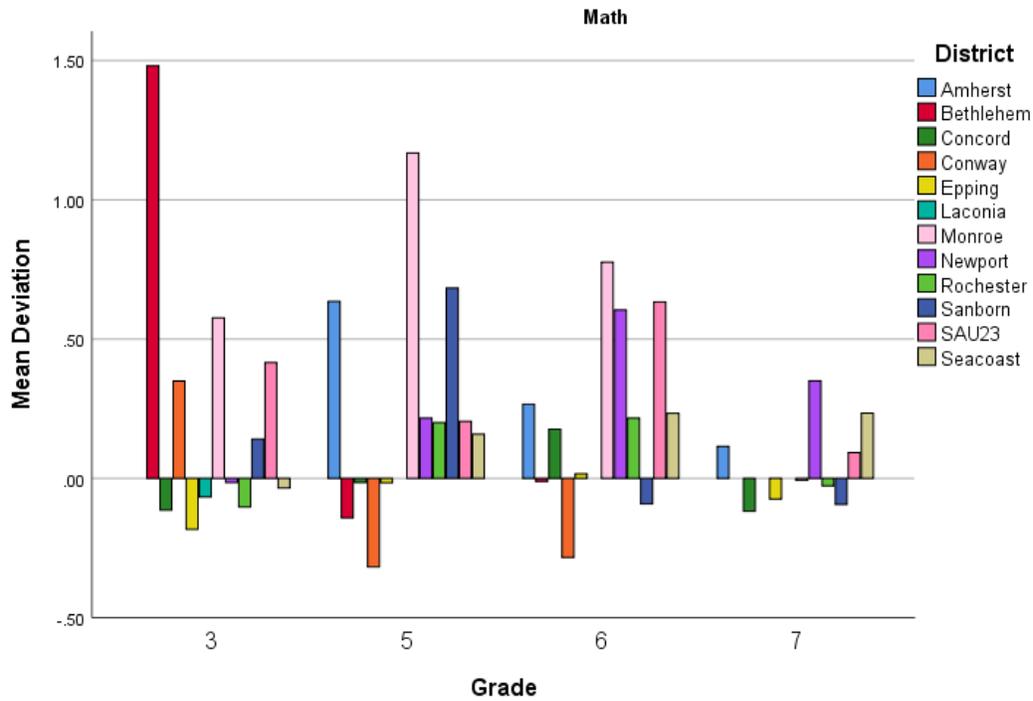


Figure 3. Mean Deviations by District and Grade for Math

Table 9. Mean deviations by subject and grade

Subject	Gr	Mean Deviation	N	SD	+0.5	-0.5
ELA	4	0.4012	183	0.61372	0.90	-0.10
	5	0.1884	207	0.49464	0.69	-0.31
	6	0.2429	194	0.57207	0.74	-0.26
	7	0.1715	156	0.65734	0.67	-0.33
<i>ELA average</i>		<i>0.2517</i>	<i>740</i>	<i>0.58745</i>		
Math	3	0.1374	199	0.58112	0.64	-0.36
	5	0.1700	197	0.63298	0.67	-0.33
	6	0.1969	197	0.53367	0.70	-0.30
	7	0.0529	160	0.43561	0.55	-0.45
<i>Math average</i>		<i>0.1435</i>	<i>753</i>	<i>0.55712</i>		

Note. ± 0.50 -points = half-point difference of subject and grade level average on the scale of the rubric

Overall, ELA teachers tended to be more lenient than consensus scorers across subject areas (ELA average=0.25, SD=0.59; Math average=0.14, SD=0.56). Table 10 disaggregates the mean

deviations by district, subject and grade. Yellow highlights indicate where the mean deviation is ± 0.50 -points different than the subject and grade level average deviation shown in Table 9. Cells with less than 10 students are highlighted to indicate the lack of precision with those deviations and the associated uncertainty. SAU23 mean deviations by subject and grade shown below indicate that there is no need for further action since all mean deviations are within ± 0.50 -points of the subject and grade level average on the scale of the rubric.

Table 10. Mean deviations by district, subject area, and grade

District	Subject	Gr	Mean Deviation	N	SD
Amherst	ELA	5	0.41	20	0.35610
		6	0.81	18	0.60970
		7	-0.25	19	0.65085
	Math	5	0.63	21	0.75781
		6	0.27	20	0.33502
		7	0.12	20	0.43441
Bethlehem	ELA	4	0.27	13	0.52502
		5	0.01	20	0.48310
		6	0.23	15	0.46739
	Math	3	1.48	9	0.29535
		5	-0.14	20	0.62948
		6	-0.01	15	0.41013
Concord	ELA	4	0.70	19	0.55640
		5	0.30	10	0.45338
		6	0.03	20	0.68777
		7	0.22	23	0.53462
	Math	3	-0.11	19	0.37729
		5	-0.01	22	0.46529
		6	0.18	17	0.44368
		7	-0.12	22	0.43054
Conway	ELA	4	0.83	18	0.69133
		5	0.25	17	0.43301

		6	0.13	20	0.46946
	Math	3	0.35	20	0.42519
		5	-0.32	20	0.48881
		6	-0.28	20	0.42249
Epping	ELA	4	0.36	20	0.67607
		5	0.18	20	0.53250
		6	0.03	20	0.44352
		7	0.28	20	0.57297
	Math	3	-0.18	20	0.38277
		5	-0.02	20	0.36559
		6	0.02	20	0.59723
		7	-0.07	19	0.36223
Laconia	ELA	4	-0.06	13	0.57850
		5	-0.08	19	0.37317
	Math	3	-0.07	20	0.44191
Monroe	ELA	4	0.56	4	0.12500
		5	0.25	6	0.38730
		6	0.00	6	0.22361
	Math	3	0.58	11	0.45035
		5	1.17	2	1.17615
		6	0.78	6	0.54393
		7	-0.01	8	0.59788
Newport	ELA	4	0.35	20	0.59272
		5	0.11	20	0.30859
		6	0.65	19	0.47795
		7	0.27	24	0.49955
	Math	3	-0.02	21	0.51043
		5	0.22	20	0.49899

		6	0.60	19	0.53096
		7	0.35	19	0.40035
Rochester	ELA	4	0.40	17	0.51583
		5	0.69	20	0.54335
		6	0.15	20	0.57583
		7	-0.15	20	0.65091
	Math	3	-0.10	21	0.53315
		5	0.20	20	0.53461
		6	0.22	20	0.38275
		7	-0.03	20	0.38497
Sanborn	ELA	4	0.08	20	0.57411
		5	0.16	19	0.51512
		6	0.04	20	0.45360
		7	0.63	19	0.84314
	Math	3	0.14	19	0.50167
		5	0.68	20	0.54640
		6	-0.09	20	0.35720
		7	-0.09	19	0.27585
SAU23	ELA	4	0.53	19	0.62302
		5	0.21	17	0.38765
		6	0.55	16	0.50182
		7	0.48	14	0.49482
	Math	3	0.42	20	0.45673
		5	0.20	13	0.51917
		6	0.63	20	0.56020
		7	0.09	13	0.61976
Seacoast	ELA	4	0.39	20	0.45505
		5	-0.14	19	0.52912

	6	0.04	20	0.44629
	7	-0.07	17	0.54317
Math	3	-0.03	19	0.53204
	5	0.16	19	0.64209
	6	0.23	20	0.43408
	7	0.23	20	0.34092

Note: Yellow highlights indicate that the mean deviation is ± 0.50 -points different than the grade level average on the scale of the rubric.

The analysis of mean deviation differences by district, grade, and subject noted three areas for further review: Sanborn Grade 5 Math, Rochester Grade 5 ELA, and Amherst Grade 6 ELA. The impact analyses explained in the next section was used to examine each of these scales based on historical trends over time. Results of those investigations are as follows:

- Sanborn Grade 5 Math: Local scoring in this grade/subject did not appear lenient as the state test analysis showed that this grade/subject had the lowest proficiency rate of any PACE grade in Sanborn math analyses. No further action is recommended.
- Rochester Grade 5 ELA: Local scoring in this grade/subject did not appear lenient as the cohort and longitudinal analyses show a drop in proficiency rates from 2018 to 2019. No further action is recommended.
- Amherst Grade 6 ELA: Local scoring in this grade/subject did not appear lenient as the cohort analyses showed a reduction in the percent of students deemed proficient or above from 2018 to 2019 and the results for 2019 were similar to state test results in this grade/subject. No further action is recommended.

PACE 2019 Concurrent and Non-Concurrent Validity Analyses Report

We evaluated the comparability of the annual determinations between PACE and non-PACE assessment system (NH SAS) using both a concurrent and non-concurrent evaluation of comparability. The concurrent analysis calculates PACE annual determinations for the grades that are currently taking NH SAS and compares the results. The non-concurrent analysis compares performance for the same students on the two assessment systems across years. Detailed analyses that compares the percent proficient or above across the PACE and statewide assessment system for the PACE districts can be found in the impact analyses along with cohort and longitudinal analyses (pages 19-37 for aggregated analyses across the PACE districts and pages 129-278 for disaggregated analyses by district).

Concurrent Evaluation of Comparability: PACE non-reported 2019 to NH SAS 2019

PACE annual determinations were calculated for the students taking NH SAS this year. This means the state has NH SAS and PACE 2019 annual determinations for students in grade 3 ELA, grade 4 math, grade 8 ELA and math. Though annual determinations were not reported for these subjects and grades using the PACE results and no common performance task was administered, the same procedure for producing PACE annual determinations was used in these grade levels as for the PACE reported annual determinations. Table 1 shows the number of matched students by subject, grade, and district included in the analyses below.

Table 1.

Number of matched students by subject, grade, and district in the concurrent validity analyses

Subject	Grade	District	N	Percent
ELA	3	Concord SAU Office	283	26.2
		Conway SAU Office	39	3.6
		Epping SAU Office	77	7.1
		Haverhill Cooperative SAU Office	73	6.7
		Laconia SAU Office	147	13.6
		Monroe SAU Office	11	1.0
		Newport SAU Office	65	6.0
		Rochester SAU Office	270	25.0
		Sanborn Regional SAU Office	74	6.8
		SAU #35 Office	13	1.2
		Seacoast Charter School	30	2.8
		Total	1082	100.0

Subject	Grade	District	N	Percent
ELA	8	Amherst SAU Office	167	18.8
		Concord SAU Office	258	29.1
		Epping SAU Office	66	7.4
		Haverhill Cooperative SAU Office	9	1.0
		Monroe SAU Office	10	1.1
		Rochester SAU Office	249	28.1
		Sanborn Regional SAU Office	93	10.5
		Seacoast Charter School	34	3.8
		Total	886	100.0
Math	4	Concord SAU Office	260	27.1
		Epping SAU Office	62	6.5
		Haverhill Cooperative SAU Office	22	2.3
		Laconia SAU Office	129	13.4
		Monroe SAU Office	3	0.3
		Newport SAU Office	62	6.5
		Rochester SAU Office	290	30.2
		Sanborn Regional SAU Office	94	9.8
		SAU #35 Office	12	1.2
		Seacoast Charter School	27	2.8
Total	961	100.0		
Math	8	Amherst SAU Office	164	21.0
		Concord SAU Office	261	33.4
		Epping SAU Office	66	8.4
		Haverhill Cooperative SAU Office	9	1.2
		Monroe SAU Office	11	1.4
		Rochester SAU Office	170	21.7
		Sanborn Regional SAU Office	67	8.6
		Seacoast Charter School	34	4.3
Total	782	100.0		

Figure 1 displays the overall percent of students scoring proficient or above in ELA and math between the two assessment systems. The blue bars represent PACE and red bars represent NH SAS. The degree of similarity in the percentage of students deemed proficient or above across the two assessment systems further supports the comparability of proficiency designations between assessment systems.

Additional validity evidence from one district (Amherst) was available in 2019 because Amherst decided to administer the NH SAS and PACE assessment systems to all students in three grade/subject combinations (Gr 6 ELA and Math; Gr 7 ELA). This “special case” analysis can be found in the impact analyses report starting on page 19. Findings from those analyses support the comparability of results from the two assessment systems.

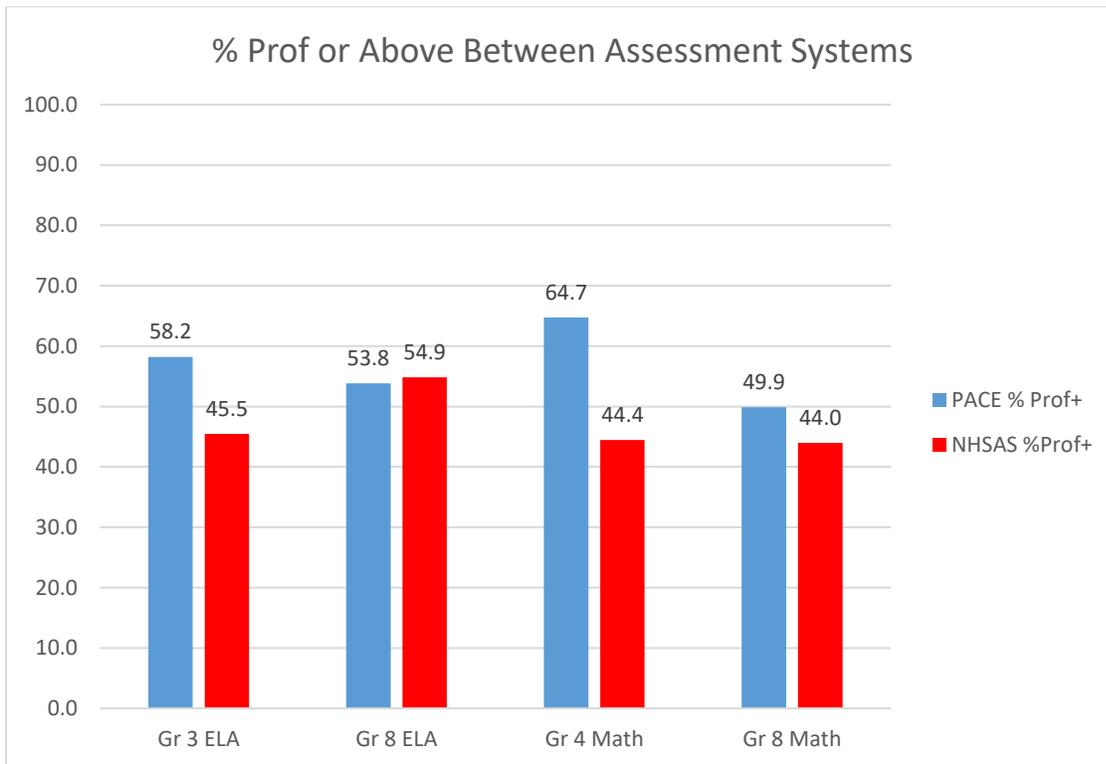


Figure 1. Percentage of students proficient or above in ELA and math between the PACE and NH SAS assessment systems by grade level

Table 2 provides the achievement level frequency counts and percentages for the two sets of annual determinations. The degree of similarity between the distributions provides further support regarding the high degree of comparability of the students scoring at the reported achievement levels.

Table 2.

Frequency counts and percentages for achievement levels in ELA and math between the PACE and NH SAS assessment systems by subject and grade level

			PACE		SAS	
Subject	Grade	Achievement Level	N	Percent	N	Percent
ELA	3	1	132	12.2	305	28.2
		2	320	29.6	285	26.3
		3	561	51.8	293	27.1
		4	69	6.4	199	18.4
ELA	8	1	45	5.1	186	21.0
		2	364	41.1	214	24.2
		3	377	42.6	351	39.6
		4	100	11.3	135	15.2
Math	4	1	74	7.7	220	22.9
		2	265	27.6	314	32.7
		3	499	51.9	295	30.7
		4	123	12.8	132	13.7
Math	8	1	80	10.2	229	29.3
		2	312	39.9	209	26.7
		3	321	41.0	155	19.8
		4	69	8.8	189	24.2

Table 3 provides a cross tabulation of achievement levels for the two sets of annual determinations by subject and grade level.

Table 3.

Crosstabs with frequency counts and percentages for achievement levels in ELA and math between the PACE and NH SAS assessment systems by grade level

					SAS			
Subject	Grade	Achievement Level		Achievement Level				
				1	2	3	4	
ELA	3	PACE	1	Count	113	14	4	1
				% of Total	10.4%	1.3%	0.4%	0.1%
			2	Count	129	117	58	16
				% of Total	11.9%	10.8%	5.4%	1.5%
			3	Count	61	144	213	143
				% of Total	5.6%	13.3%	19.7%	13.2%
			4	Count	2	10	18	39
				% of Total	0.2%	0.9%	1.7%	3.6%
ELA	8	PACE	1	Count	25	17	2	1
				% of Total	2.8%	1.9%	0.2%	0.1%
			2	Count	132	116	104	12
				% of Total	14.9%	13.1%	11.7%	1.4%
			3	Count	26	71	207	73
				% of Total	2.9%	8.0%	23.4%	8.2%
			4	Count	3	10	38	49
				% of Total	0.3%	1.1%	4.3%	5.5%
Math	4	PACE	1	Count	62	10	2	0
				% of Total	6.5%	1.0%	0.2%	0.0%
			2	Count	113	124	26	2
				% of Total	11.8%	12.9%	2.7%	0.2%
			3	Count	43	167	212	77
				% of Total	4.5%	17.4%	22.1%	8.0%
			4	Count	2	13	55	53
				% of Total	0.2%	1.4%	5.7%	5.5%
Math	8	PACE	1	Count	69	9	1	1
				% of Total	8.8%	1.2%	0.1%	0.1%
			2	Count	136	115	36	25
				% of Total	17.4%	14.7%	4.6%	3.2%
			3	Count	24	83	108	106
				% of Total	3.1%	10.6%	13.8%	13.6%
			4	Count	0	2	10	57
				% of Total	0.0%	0.3%	1.3%	7.3%

Table 4 aggregates the crosstabs above showing the percentage of exact agreement, adjacent agreement and percentage of exact or adjacent agreement by grade and subject area. Importantly, there is almost 90% exact or adjacent agreement on achievement levels for all grades and subjects between the two assessment systems.

Table 4.
Percent agreement between the PACE and NH SAS assessment systems by grade level and subject area

	%Exact Agreement	% Adjacent Agreement	%Exact or Adjacent Agreement
Grade 3 ELA	44.55%	46.77%	91.31%
Grade 8 ELA	44.81%	49.10%	93.91%
Grade 4 Math	46.93%	46.62%	93.55%
Grade 8 Math	44.63%	48.59%	93.22%

Table 5 provides additional information regarding the classification accuracy across the assessment systems. “Classification accuracy” refers to the percentage of students who received the same proficiency classification (i.e., ‘proficient’=Yes or ‘not proficient’=No) across the two years. It is important to note that these analyses assume no student growth across years.

Table 5.
Classification accuracies between the PACE and NH SAS assessment systems by grade level and subject area

			SAS			
Subject	Grade	PACE	Proficiency Designation (0="not proficient"; 1="proficient or above")			
				0	1	
ELA	3	PACE	0	Count	373	79
				% of Total	34.5%	7.3%
			1	Count	217	413
				% of Total	20.1%	38.2%
ELA	8	PACE	0	Count	290	119
				% of Total	32.7%	13.4%
			1	Count	110	367
				% of Total	12.4%	41.4%
Math	4	PACE	0	Count	309	30
				% of Total	32.2%	3.1%

			1	Count	225	397
				% of Total	23.4%	41.3%
Math	8	PACE	0	Count	329	63
				% of Total	42.1%	8.1%
			1	Count	109	281
				% of Total	13.9%	35.9%

For all four comparisons presented in Table 5, the classification accuracy falls between 73% and 78%. While this agreement is high, there are a variety of reasons why there may be legitimate differences in the results produced by the different assessment systems. First, the degree of agreement is limited by the reliability of each assessment system. In other words, an assessment cannot correlate more with another assessment than it can with itself (i.e., reliability). Therefore, because both PACE and NH SAS are not perfectly reliable, we may be approaching the upper bound of the relationship between the two assessment systems. Additionally, New Hampshire’s PACE assessment system is in place to measure the state-defined learning targets differently than they are measured in the statewide assessment system. The purpose is to measure the standards more deeply and authentically through performance-based assessments. Additionally, the PACE assessment system is intended to measure the set of standards more completely (e.g., including the listening and speaking standards). The demonstrated approximately 75% agreement in proficiency classification across the two systems should be considered acceptable given the competing objectives of attaining comparability while designing and implementing an innovative assessment system that is intended to create meaningful changes to teaching and learning.

Table 6 shows the proficiency classification accuracies for the waiver-reported subgroups. The classification accuracies for the reported subgroups do not vary greatly from the overall classification accuracy of approximately 75%. Some variation around 75% is natural due to sampling error associated with the small sample sizes of many of the subgroups. In fact, because New Hampshire is predominantly White (90%), the numbers of students in each of the racial/ethnic subgroups is generally below 30 or 40 students. The same is true for the numbers of English learners. A comparison with last year’s concurrent classification accuracies by subgroup does not reveal any systematic patterns.

Table 6.
Proficiency classification accuracies between the PACE and NH SAS assessment systems for the waiver-reported subgroups by grade and subject area

	Gr 3 ELA	Gr 8 ELA	Gr 4 Math	Gr 8 Math
All	72.64	74.15	73.47	78.01
EconDis - Economically Disadvantaged	71.90	76.78	72.59	82.90
EL- Current + Monitoring Years 1-4	66.67	58.82	75.00	78.95
IEP/SWD - IEP	84.43	76.00	82.61	84.33
Race - American Indian or Alaskan Native	**	**	**	**

Race - Asian	76.67	66.67	78.26	67.86
Race - Black or African American	75.86	76.92	86.11	92.00
Race - Hispanic	65.79	61.11	48.57	83.33
Race - Two or more races	62.96	**	57.89	**
Race - White	73.00	74.90	74.35	77.33

**Count is below cell size of 10.

Non-Concurrent Evaluation of Comparability

We conducted two non-concurrent comparability evaluations because students participate in NH SAS once per grade span: SAS 2018 to PACE 2019 and PACE 2018 to SAS 2019. Each analysis is discussed in a separate section below.

SAS 2018 to PACE 2019

The first analysis compares last year’s performance on NH SAS in grade 3 ELA and grade 4 math with this year’s performance on PACE for students in grade 4 ELA and grade 5 math. Only students with a NH SAS achievement level in 2018 and a PACE achievement level in 2019 are used for these analyses. Figure 2 shows the percent proficient or above for the matched cohort of students across years. The red bars indicate SAS and the blue bars represent PACE. The percent proficient or above went slightly up from SAS 2018 to PACE 2019 in both ELA and math. The results demonstrate remarkable consistency of expectations for the same students as we would expect some growth to proficiency from one year to the next.

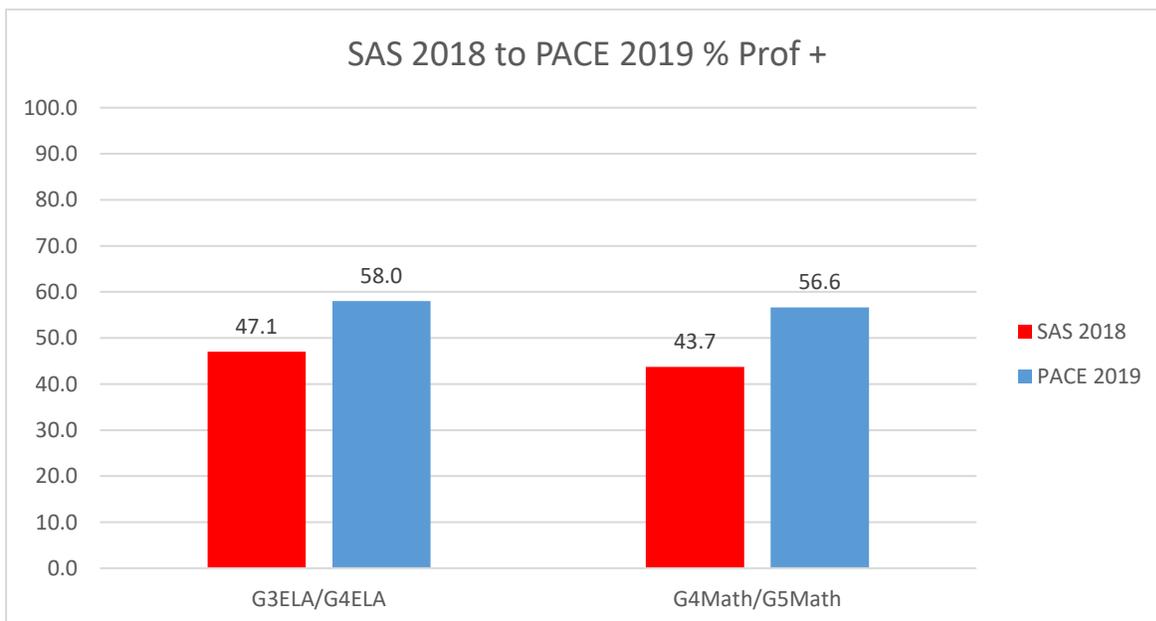


Figure 2. Cohort percent proficient or above across SAS 2018 to PACE 2019

Table 7 provides the achievement levels with frequency counts and percentages for SAS 2018 and PACE 2019 by grade level and subject area. In general, PACE has fewer students at Levels 1

and 4 than NH SAS, which is designed to more evenly spread students across the distribution of performance levels.

Table 7.
Achievement levels with frequency counts and percentages for SAS 2018 and PACE 2019 by grade level and subject area

		SAS 2018		PACE 2019	
Subject	Achievement Level	N	Percent	N	Percent
G3/G4 ELA	1	284	25.7	88	8.0
	2	300	27.2	375	34.0
	3	305	27.7	550	49.9
	4	214	19.4	90	8.2
G4/G5 Math	1	289	22.8	92	7.3
	2	425	33.5	458	36.1
	3	386	30.4	586	46.2
	4	168	13.2	132	10.4

Table 8 provides a cross tabulation of achievement levels from SAS 2018 to PACE 2019 by grade level and subject area.

Table 8.
Crosstabs with frequency counts and percentages for achievement levels from SAS 2018 to PACE 2019 by grade level and subject area

			PACE 2019				
Subject	Achievement Levels		1	2	3	4	
G3/G4 ELA	SAS 2018	1	Count	70	153	58	3
			% of Total	6.3%	13.9%	5.3%	0.3%
		2	Count	16	131	141	12
			% of Total	1.5%	11.9%	12.8%	1.1%
		3	Count	1	77	202	25
			% of Total	0.1%	7.0%	18.3%	2.3%
		4	Count	1	14	149	50
			% of Total	0.1%	1.3%	13.5%	4.5%
G4/G5 MATH	SAS 2018	1	Count	72	165	52	0
			% of Total	5.7%	13.0%	4.1%	0.0%
		2	Count	16	213	189	7
			% of Total	1.3%	16.8%	14.9%	0.6%
		3	Count	4	72	265	45
	% of Total	0.3%	5.7%	20.9%	3.5%		

	4	Count	0	8	80	80
		% of Total	0.0%	0.6%	6.3%	6.3%

Table 9 aggregates the crosstabs above showing the percentage of exact agreement, adjacent agreement, and exact or adjacent agreement by grade and subject area across the assessment systems from SAS 2018 to PACE 2019. Importantly, while there is variation across the two assessment programs over two years, the degree of agreement is high across years ranging from 92% to 94% exact or adjacent agreement. The correlations between the two assessment programs across years are $r=0.55$ ($p<.001$) for ELA and $r=0.62$ for math ($p<.001$). The strength of the correlations between SAS 2018 and PACE 2019 are quite high given the intentional differences in design and purpose. Also, these analyses assume that students did not change their performance levels across years when, in fact, we know that not to be true.

Table 9.
Percent agreement across SAS 2018 to PACE 2019

	%Exact Agreement	%Adjacent Agreement	%Exact or Adjacent Agreement
G3/G4 ELA	41.07%	50.86%	91.93%
G4/G5 Math	49.68%	44.72%	94.40%

As was done with the concurrent comparability analyses, the 2x2 classification tables are provided in Table 10. “Classification accuracy” refers to the percentage of students who received the same proficiency classification (i.e., ‘proficient’ or ‘not proficient’) across the two years. In this case, classification accuracy may be a misnomer since students can and do legitimately change in their classifications across years. In fact, schools are purposefully trying to improve the performance of students across years.

Table 10.
Classification accuracies across SAS 2018 to PACE 2019

Subject/Grade	Proficiency Designation (0="not proficient"; 1="proficient or above")	PACE 2019		
		0	1	
G3/G4 ELA	SAS 2018	0 Count	370	214
		% of Total	33.5%	19.4%
		1 Count	93	426
		% of Total	8.4%	38.6%
G4/G5 Math	0	Count	466	248

SAS 2018	% of Total	36.8%	19.6%
	1 Count	84	470
	% of Total	6.6%	37.1%

We expect to see students either staying within the same cell or moving from non-proficient to proficient from 2018 to 2019. We see evidence of this pattern in both Grade 3 to 4 ELA and Grade 4 to 5 Math as the percent of students moving from proficient (=1) to non-proficient (=0) is 7-8%.

PACE 2018 to NH SAS 2019

The second non-concurrent validity analysis compares last year’s performance on PACE in grade 3 math, grade 7 ELA, grade 7 math, and grade 4 science with this year’s performance on NH SAS for students in grade 4 math, grade 8 ELA, grade 8 math, and grade 5 science. The grade 4 to grade 5 science analysis is a one-year addition to the non-concurrent validity analyses as all PACE students had a one-year transition from PACE in grade 4 science to PACE in grade 5 science in which they took NH SAS in grade 5.

Only students with a PACE achievement level in 2018 and a NH SAS achievement level in 2019 are used for these analyses. Figure 3 shows the percent proficient or above for the matched cohort of students across years. The red bars indicate NH SAS and the blue bars represent PACE. In one out of the four grades and subject areas, the percent proficient rose from PACE 2018 to NH SAS 2019 (i.e., Gr7/G8 ELA), in two grades and subject areas the percent proficient went down from PACE 2018 to NH SAS 2019 (i.e., G3/G4 Math and G4/G5 Science), and in one grade and subject area the percent proficient was almost exact across years (G7/G8 Math). These findings indicate that PACE is at least as rigorous as NH SAS.

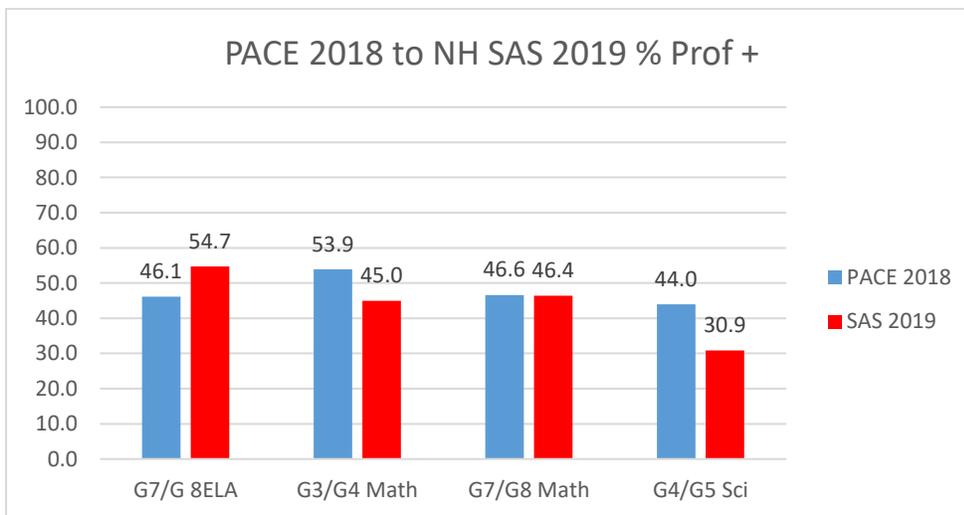


Figure 3. Cohort percent proficient or above across PACE 2018 to NH SAS 2019

Table 11 provides the achievement levels with frequency counts and percentages for PACE 2018 and NH SAS 2019 by grade level and subject area. In general, PACE has fewer students at

Levels 1 and 4 than NH SAS, which is designed to more evenly spread students across the distribution of performance levels.

Table 11.
Achievement levels with frequency counts and percentages for PACE 2018 and NH SAS 2019 by grade level and subject area

		PACE 2018		SAS 2019	
Grade	Achievement Level	N	Percent	N	Percent
G7/G8 ELA	1	71	6.7	232	21.9
	2	499	47.2	247	23.3
	3	369	34.9	418	39.5
	4	119	11.2	161	15.2
G3/G4 Math	1	121	10.6	264	23.1
	2	405	35.5	364	31.9
	3	545	47.8	358	31.4
	4	70	6.1	155	13.6
G7/G8 Math	1	117	11.5	290	28.5
	2	427	41.9	256	25.1
	3	369	36.2	216	21.2
	4	106	10.4	257	25.2
G4/G5 Sci	1	103	9.0	481	42.2
	2	536	47.0	308	27.0
	3	395	34.6	239	20.9
	4	107	9.4	113	9.9

Table 12 provides a cross tabulation of achievement levels from PACE 2018 to NH SAS 2019 by grade level and subject area.

Table 12.
Crosstabs with frequency counts and percentages for achievement levels from PACE 2018 to NH SAS 2019 by grade level and subject area

			SAS 2019				
Grade/ Subject	Achievement Levels		1	2	3	4	
G7/G8 ELA	PACE 2018	1	Count	40	22	9	0
			% of Total	3.8%	2.1%	0.9%	0.0%
		2	Count	170	149	164	16
			% of Total	16.1%	14.1%	15.5%	1.5%
		3	Count	20	63	192	94
			% of Total	1.9%	6.0%	18.1%	8.9%
		4	Count	2	13	53	51

G3/G4 Math		% of Total	0.2%	1.2%	5.0%	4.8%
	1	Count	90	23	8	0
		% of Total	7.9%	2.0%	0.7%	0.0%
	2	Count	132	171	87	15
		% of Total	11.6%	15.0%	7.6%	1.3%
	3	Count	42	165	235	103
		% of Total	3.7%	14.5%	20.6%	9.0%
G7/G8 Math	4	Count	0	5	28	37
		% of Total	0.0%	0.4%	2.5%	3.2%
	1	Count	71	33	7	6
		% of Total	7.0%	3.2%	0.7%	0.6%
	2	Count	176	121	83	47
		% of Total	17.3%	11.9%	8.1%	4.6%
	3	Count	41	95	105	128
G4/G5 Sci		% of Total	4.0%	9.3%	10.3%	12.6%
	4	Count	2	7	21	76
		% of Total	0.2%	0.7%	2.1%	7.5%
	1	Count	77	18	7	1
		% of Total	6.7%	1.6%	0.6%	0.1%
	2	Count	287	151	75	23
		% of Total	25.2%	13.2%	6.6%	2.0%
	3	Count	91	107	129	68
		% of Total	8.0%	9.4%	11.3%	6.0%
	4	Count	26	32	28	21
		% of Total	2.3%	2.8%	2.5%	1.8%

Table 13 aggregates the crosstabs above showing the percentage of exact agreement and percentage of exact or adjacent agreement by grade and subject area across the assessment systems from PACE 2018 to NH SAS 2019. The degree of agreement is high across years ranging from 89% to 94% exact or adjacent agreement. The correlations between the two assessment programs across years are $r=0.55$ ($p<.001$) for ELA and math, but lower for science ($r=0.39$, $p<.001$). As mentioned previously, given the fact that no assessment is likely to correlate more highly with a different assessment than with itself, the strength of the correlations between PACE 2018 and SAS 2019 are remarkably high, except for science which is lower than expected. The lower than expected percent agreement and correlations across years in science is likely due to the implementation of a new NH SAS science assessment in Grade 5 in 2019 in which there was low performance across the state not just in PACE districts.

Table 13.
Percent agreement across PACE 2018 to NH SAS 2019

	%Exact Agreement	%Adjacent Agreement	%Exact or Adjacent Agreement
G7/G8 ELA	40.83%	53.50%	94.33%
G3/G4 Math	46.71%	47.15%	93.87%
G7/G8 Math	36.60%	52.60%	89.21%
G4/G5 Sci	33.13%	51.10%	84.22%

The 2x2 classification tables for PACE 2018 to NH SAS 2019 are provided in Table 14 below. Again, classification accuracy may be a misnomer since students can and do legitimately change their performance levels across years.

Table 14.
Classification accuracies across PACE 2018 to NH SAS 2019

		SAS 2019			
Subject/ Grade	Proficiency Designation (0="not proficient"; 1="proficient or above")			0	1
		Count	% of Total	Count	% of Total
Gr7/G8 ELA	PACE 2018	0	Count	381	189
			% of Total	36.00%	17.90%
	1	Count	98	390	
		% of Total	9.30%	36.90%	

G3/G4 Math	0	Count	416	110
		% of Total	36.50%	9.60%
	1	Count	212	403
		% of Total	18.60%	35.30%
G7/G8 Math	0	Count	401	143
		% of Total	39.40%	14.00%
	1	Count	145	330
		% of Total	14.20%	32.40%
G4/G5 Sci	0	Count	533	106
		% of Total	46.70%	9.30%
	1	Count	256	246
		% of Total	22.40%	21.60%

The classification accuracies across years are about the same as the classification accuracies observed for the concurrent and other non-concurrent year comparisons, ranging from 68% to 73%. There is a larger percent of students who went from proficient to not proficient in G4/G5 science, which is to be expected given the rigor of the new Grade 5 NH SAS science assessment. We will continue to monitor proficiency changes from year-to-year in the coming years.

Table 15 shows the proficiency classification accuracies for the waiver-reported subgroups for both cross-year analyses: NH SAS 2018 to PACE 2019 and PACE 2018 to NH SAS 2019. These statistics are disaggregated by subject but not by grade level (where applicable) in order to increase the likelihood of having cell sizes larger enough to report. Science is not reported due to small sample sizes. As with the concurrent analyses, the classification accuracies of the subgroups do not seem to vary greatly from the overall observed classification accuracies. The only subgroup with a proficiency classification accuracy of less than 60% is students who are classified as Two or more races in PACE 2018 to NH SAS 2019 Math. We will pay particular attention to this subgroup in next year's analyses to ensure this is not indicative of something systematic.

Table 15.

Proficiency classification accuracies for subgroups by non-concurrent validity analysis

	NH SAS 2018 to PACE 2019		PACE 2018 to NH SAS 2019	
	ELA	Math	ELA	Math
All	72.17	73.82	72.87	71.76
EconDis - Economically Disadvantaged	72.73	72.78	75.33	74.61
EL- Current + Monitoring Years 1-4	70.21	65.79	95.45	85.71
IEP/SWD - IEP	80.00	77.36	76.56	76.92
Race - American Indian or Alaskan Native	**	*	**	*
Race - Asian	72.73	81.48	72.97	77.05
Race - Black or African American	73.68	65.91	82.76	82.35

Race - Hispanic	61.22	63.27	70.73	70.24
Race - Two or more races	68.42	65.22	63.64	53.33
Race - White	72.83	74.69	72.64	71.48

**Count is below cell size of 10.

PACE 2019 Body of Work (BOW) Standards Validation Report

Introduction and Method

We employed a “body of evidence” approach to help evaluate the annual determinations produced for the 2018-19 school year. All new PACE implementing districts in the 2018-19 school year were required to submit portfolios of student work for a minimum of nine students from all of the PACE accountability grades (as applicable): Gr 4-7 ELA, Gr 3, 5-7 Math; and Gr 8 Science. Districts that had implemented PACE for accountability in the past were systematically sampled with the same minimum number of nine students submitted to ensure that samples are collected from all grade levels and subject areas across PACE districts (see Table 1 below).

Table 1.
Requested Body of Work Samples 2018-19 School Year

District	Required Grades & Subjects
Amherst (Gr 5-8)	Gr 5 ELA, Gr 6 Math, Gr 7 ELA, Gr 8 Sci
Bethlehem (Gr 3-6)	Gr 3 Math, Gr 4 ELA, Gr 5 Math, Gr 6 ELA
Concord (Gr 3-8)	Gr 4 ELA, Gr 5 Math, Gr 6 Math, Gr 7 ELA, Gr 8 Sci
Conway (Gr 3-6)**	Gr 3 Math, Gr 4 ELA, Gr 5 ELA & Math, Gr 6 ELA & Math
Epping (Gr 3-8)	Gr 3 Math, Gr 5 ELA, Gr 6 ELA, Gr 7 Math, Gr 8 Sci
Laconia (Gr 3-5)	Gr 3 Math, Gr 5 ELA, Gr 5 Math
Monroe (Gr 3-8)	Gr 4 ELA, Gr 5 Math, Gr 6 Math, Gr 7 ELA, Gr 8 Sci
Newport (Gr 3-5)	Gr 3 Math, Gr 4 ELA, Gr 5 Math
Pittsfield (Gr 3-8)	Gr 3 Math, Gr 5 ELA, Gr 6 ELA, Gr 7 Math, Gr 8 Sci
Plymouth (Gr 3-8)	Gr 4 ELA, Gr 5 Math, Gr 6 Math, Gr 7 ELA, Gr 8 Sci
Rochester (Gr 3-8)	Gr 3 Math, Gr 5 ELA, Gr 6 ELA, Gr 7 Math, Gr 8 Sci
Sanborn (Gr 3-8)	Gr 4 ELA, Gr 5 Math, Gr 6 Math, Gr 7 ELA, Gr 8 Sci
SAU23 (Gr 3-8)	Gr 3 Math, Gr 5 ELA, Gr 6 ELA, Gr 7 Math, Gr 8 Sci
Seacoast (Gr 3-8)	Gr 4 ELA, Gr 5 ELA, Gr 6 Math, Gr 7 Math, Gr 8 Sci

Note. **New implementing district in 2018-19.

Districts were instructed to select the nine students to represent a range of achievement. For example, three generally low-performing students, three high-performing students, and three students who perform at about an average level. Districts were also instructed to select the student work samples included in the Body of Work (BOW) portfolios from major summative assessments throughout the year in order to demonstrate student achievement for each of the grade/subject competencies.

Participating PACE teachers came together at the PACE Summer Institute on July 17, 2019 to participate in a modified Body of Work standards validation process. The purpose of the validation process was to review portfolios of student work and make judgments about student

achievement relative to the PACE Achievement Level Descriptors. Teachers were randomly assigned to cross-district teams of two to four people and independently rated bodies of work from other districts using the PACE Achievement Level Descriptors. The independent ratings took place in two rounds. The teams discussed their independent rating with their assigned partners between each round using evidence from the body of student work to support their ratings.

Rather than using the median value of the Round 2 ratings—as is traditionally done with the body of work standard setting method—we only use scores of those raters who agreed on a given achievement level for the portfolios of work. We decided on this approach because there is still considerable variability in the quality of the student work portfolios submitted (though we continue to see improvements over time in the quality of evidence submitted). This consensus rating inspires more confidence that the quality of the body of work was sufficient for making a consistent judgment about student performance. We then compared this score (rating) to the teacher judgment survey (TJS) rating used to set standards as both judgments are based on the PACE Achievement Level Descriptors. Because the PACE annual determinations are grounded in the work that students produce throughout the year, this “body of work” analysis provides particularly useful validity evidence to support the PACE innovative assessment system.

Analyses and Results

Students included in these analyses were those who had both a consensus BOW rating and TJS rating. We matched on unique student ID, district, subject, and grade level. Table 2 shows the number of matched BOW and TJS ratings by grade, subject, and district². Table 3 shows the number of BOW ratings and TJS ratings by achievement level.

Table 2.

Number of Matched Student Bodies of Work and Teacher Judgment Survey Ratings by Grade, Subject, and District

Grade	N	Subject	N	District	N
3	57	ELA	206	Amherst	41
4	56	Math	186	Bethlehem	34
5	109	Total		Concord	30
6	106			Conway	49
7	64			Epping	28
Total	392			Laconia	18
				Monroe	20
				Newport	52
				Rochester	35
				Sanborn Regional	23
				SAU23	32
				Seacoast Charter School	30
				Total	392

² Grade 8 science is not included due to difficulty matching BOW ratings to TJS ratings.

Table 3.
Number of BOW Ratings and TJS Ratings by Achievement Level

BOW			TJS		
Rating	N	%	Rating	N	%
1.0	76	19.4	1.0	21	5.4
2.0	173	44.1	2.0	112	28.6
3.0	129	32.9	3.0	188	48.0
4.0	14	3.6	4.0	71	18.1
Total	392	100.0	Total	392	100.0

Figures 1-2 below illustrate the cross tabulation of BOW ratings and TJS ratings by achievement level for ELA and math, respectively. The x-axis represents the judgment of the body of work raters, while the vertical bars represent the distributions of TJS ratings received by the students who were given each of the BOW ratings. If the methods were perfectly consistent (an unrealistic expectation), there would be only one bar for each of the points on the x-axis. We see strong agreement for students at Level 3 whereby students rated as Level 3 using the BOW method were also most likely to have received a Level 3 from the TJS ratings. This pattern is generally true for Level 4 too. However, the same does not hold for Levels 1 and 2, where the BOW ratings are more stringent than the TJS ratings. This finding is consistent with previous years and consistent with the measurement literature on the body of work method where it is well-documented that the body of work method is more rigorous than other standard setting approaches (see for example, Green, Trimble, & Lewis, 2003).

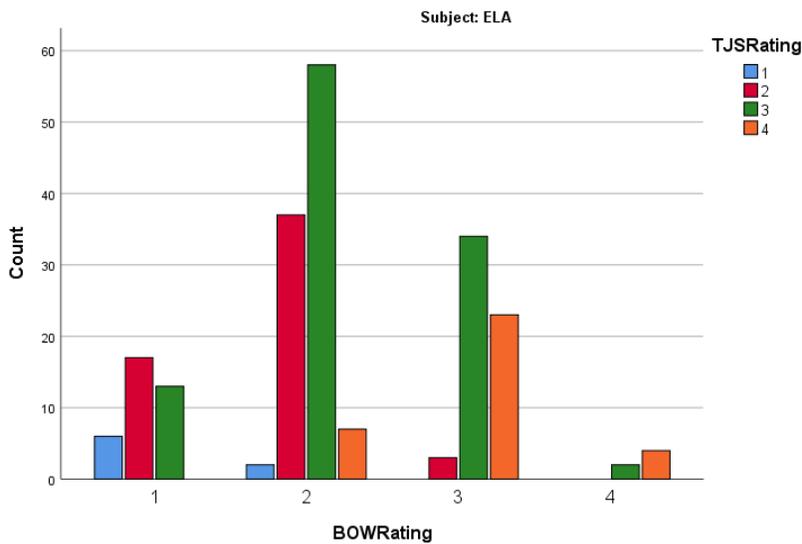


Figure 1. *Distribution of BOW Ratings by TJS Ratings in ELA*

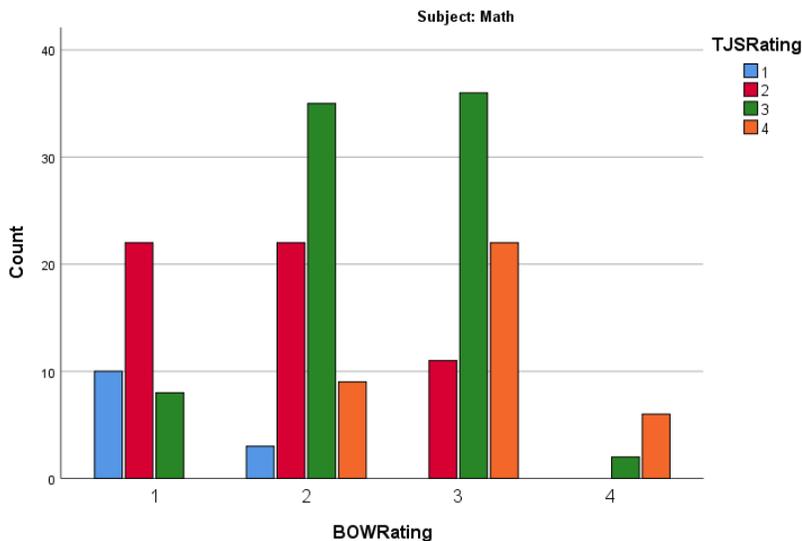


Figure 2. Distribution of BOW Ratings by TJS Ratings in Math

Table 4 provides the percentage of ratings that are in exact and adjacent agreement between the BOW ratings and TJS ratings, as well as the Spearman rank-order correlations between the BOW ratings and TJS ratings. The Spearman correlations are used to account for the fact that the input data are ordinal level, rather than continuous.

Table 4.

Percent Agreement Rates and Spearman Correlations by Subject for BOW Ratings and TJS Ratings

Subject	%Exact	%Adj	%Exact + %Adj	Spearman Correl.
ELA	39.32	50.97	90.29	0.56***
Math	39.78	51.08	90.86	0.56***

**Significant at the .001 level alpha level.

Conclusion

There is a high degree of exact and adjacent agreement between the BOW ratings and TJS ratings (>90%); however, the strength of this validity evidence would improve with stronger exact agreement rates. Many teachers anecdotally reported that upon completion of this activity, they had a greater understanding of the purpose of collecting samples of student work throughout the year that are truly reflective of the students’ achievement on the full range of competencies. Teachers found that the student work samples that had been selected to support this activity were of mixed quality, which made it difficult to find evidence to support Level 4 inferences. The Center for Assessment will continue to provide training to educators on the purpose and nature of the bodies of evidence they should be collecting throughout the year to support the collection of higher quality BOW samples. Based on the improvement in these samples we have seen over

the past several years, we expect to see continued improvement going forward. That said, the evidence presented here offers considerable support for the validity of the PACE annual determinations produced using TJS ratings in a contrasting groups method. The more rigorous standards produced using the BOW method is consistent with the standard setting literature so we should not expect perfect alignment between the two approaches.

References

Green, D. R., Trimble, C. S., & Lewis, D. M. (2003). Interpreting the results of three different standard setting procedures. *Educational Measurement: Issues and Practice*, 22, 1, 22–32.

PACE 2019 Standard Setting Report

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Introduction

The purpose of standard setting is to designate cut scores that define the four levels of performance for the PACE Annual Determinations. As in any assessment system, standard setting plays a central role in the validity of the interpretations drawn from the scores. This is especially true for PACE due to three main reasons:

1. PACE does not report out any individual-level scale scores beyond the annual determinations. This places extra burden on the validity of the interpretations drawn from the achievement level placements.
2. Each PACE district has a unique scale associated with their competency scores. Even if the scales are nominally the same (e.g., 1-4) the interpretations associated with the score points will differ across districts due to differences in scoring practices. Therefore, PACE standard setting is used as a critical aspect of comparability for the PACE assessment system.
3. The PACE innovative assessment system is required to produce annual determinations that are comparable to the statewide assessment system. Therefore, the standard setting methodology is grounded in achievement level descriptors that are aligned across systems. Each of the achievement levels is intended to carry the same interpretations about what students know and can do whether they participate in PACE or NH SAS.

Over the past five years, the PACE assessment system has achieved a strong record of creating comparable annual determinations. This has required leveraging multiple methods (e.g., see Body of Work Standards Validation) and refining our psychometric processes to continuously improve as we scale. We have relied primarily on a contrasting groups standard setting methodology described in more detail below.

Standard Setting Method

The standard setting method involves two primary steps: 1) collecting teacher judgments regarding student placement into achievement levels using the achievement level descriptors (ALDs) and 2) setting cut scores on each districts' competency score scale (scale refers to each district, grade, and subject combination) using the teacher judgements in a contrasting groups methodology.

Teacher Judgment Scores

This standard setting method involves asking teachers to make judgments about the achievement level of the students based on their professional judgment and knowledge of the student. The teachers are provided with rich, narrative descriptions of each of the achievement levels called Achievement Level Descriptors (ALD). Every PACE teacher completes a teacher judgment survey at the end of the school year to make judgments about which achievement level best describes each of their students. The subject and grade specific ALDs are entered into an online survey where teachers can easily read the descriptions and match their students to the appropriate

achievement level. This process relies heavily teacher knowledge of each of their students and on a common understanding and interpretation of the ALDs.

Contrasting Groups Method

The contrasting groups standard setting methodology involves comparing the average PACE competency scores with the teacher judgment scores in order to determine the cut scores that most accurately classify the students into the achievement levels. Logistic regression is used to determine the point in the score distribution where examinees have a 50% chance of being classified in the next performance level or above (e.g., the probability that a student with a score of X has a 50% or greater probability of being classified in Level 3 or higher). A logistic regression analysis was run separately for each cut point—Level 2, Level 3, and Level 4—in each district, subject, and grade.

Quality Control Processes and Procedures

Data quality control checks and district flagging business rules are used to ensure the quality of factors related to producing cut scores and are completed prior to calculating PACE cut scores.

Data Quality Control Checks

The data quality control checks include a systematic process for ensuring the data quality prior to running the logistic regression. The data quality control checks include the following:

- Flag out of bound values (e.g., 0.75 on a scale of 1.00 - 4.00). See Appendix A for descriptive statistics including minimum and maximum values.
- View raw data by scale (district, grade, and subject) to complete human reasonableness checks. See Appendix A for scatterplots of end of year competency scores by teacher judgment survey ratings for each district, grade, and subject combination.
- Verify the number of student records received matches the expected enrollment by scale.
- Replicate end of year competency score averages provided by state using disaggregated competency score data.

District Flagging Business Rules

Submitted teacher judgment survey ratings were analyzed by district, grade, and subject in order to identify unexpected distributions of teacher judgment prior to calculating PACE cut scores. The flagging rules evaluate variability in the teacher judgment survey ratings by district, grade, and subject in three ways:

1. Identify instances where there is *no variance* in teacher judgment survey ratings (i.e., all 1s, all 2s, all 3s, or all 4s);
2. Identify instances where there is *reduced variance* in teacher judgment survey ratings (i.e., all 1s and 2s, all 2s and 3s, or all 3s and 4s); and
3. Identify instances where there is *bimodal distribution* of teacher judgment survey ratings (i.e., all 1s and 3s, all 1s and 4s, or all 2s and 4s).

Instances where teacher judgment survey ratings show evidence of no variance, reduced variance, or bimodal distribution were analyzed using the Table 1 decision matrix below. The decision matrix guided follow-up decisions with districts and was created to balance the need for district follow-up with the realities of data issues that result from very small sample sizes. Step 1 is a simple examination of the sample size in the district, grade, and subject combination. Step 2 is an examination of the percent of students proficient or above from prior state standardized assessment results for the district and subject in the grade level closest to the grade level under investigation. Given the design of the PACE assessment system and based on the number of years the district has been involved in PACE, the available state assessment data may be limited to grade 3 ELA, grade 4 Math, or grade 8 ELA and math.

Table 1.

PACE Flagging Rules for Variability in TJS Ratings Decision Matrix

Flag for TJS Ratings	Step 1: Examine Sample Size	Step 2: Examine Prior State Standardized Assessment Results
No variance	<=5 students → no follow-up >5 students → go to Step 2	Percent of students proficient is within ± 5% of the prior state standardized assessment results → no follow-up
Reduced variance	<=15 students → no follow-up >15 students → go to Step 2	
Bimodal distribution	<=15 students → no follow-up >15 students → go to Step 2	Otherwise the district will be contacted by the NH DOE or the Center for Assessment to verify the teacher judgment survey results.

The complete district flagging business rules analysis along with the subsequent decisions related to each flag based on the decision matrix can be found in Appendix B. Importantly, no districts were contacted for follow-up based on no variance, reduced variance, or bimodal distributions in the teacher judgment survey ratings from the 2018-19 school year. Overall, the weighted average across districts ratings (Table 2) shows that teachers rated students as Level 1 and 4 about 23% of the time and Level 2 and 3 about 77% of the time.

Table 2.

Distribution of Teacher Judgment Survey Ratings 2019 Using Weighted Average

	Achievement Level 1	Achievement Level 2	Achievement Level 3	Achievement Level 4	Total

N	1147	3229	4039	1036	9451
Percent	12.14%	34.17%	42.74%	10.96%	100.00%

If follow-up with districts on the distribution of their teacher judgment survey ratings is deemed necessary in future years, the business rules specify that the Center for Assessment will not calculate cut scores until teacher judgment survey results can be verified with the district. If the teacher judgment survey results cannot be verified with the district then the district will be notified that they will receive PACE determinations for the year, but the district will need to take NH SAS along with submitting PACE data in the following year. Results from NH SAS in the following year will be compared to PACE standard setting results and if within $\pm 5\%$ on percent proficient or above in the same grade and subject area then the district will not need to administer the NH SAS the following year. Otherwise the process will continue until the district meets the $\pm 5\%$ on the proficiency threshold.

Cut Score Calculation Business Rules

Cut score calculation rules are used to ensure consistency in setting standards by delineating rules for the following:

- Addressing every possible pattern of presence/absence of teacher judgments placing student achievement in each achievement level,
- Describing the statistical process (dichotomous logistic regression) used for estimating cut scores where there are sufficient data, and
- Ensuring consistency in calculating cut scores when there are problems with estimating a cut score using the logistic regression.

There are two major parts in cut score calculation: (1) initial cut score calculations, including logistic regression of teacher judgments of students' achievement being at or above a given achievement level on students' mean competency scores to estimate cut scores for a given scale (a scale is a district, grade, and subject combination); and (2) alternate cut score calculations for situations in which the logistic regression does not converge or in which the logistic regression found a lower probability of students being at or above a specific achievement level associated with increases in mean competency scores.

The business rules take the following form:

1. For each student, identify the scale on which the student's mean competency scores exist. Typically, each school administrative unit (SAU) has its own scale in each year, subject, and grade. However, there are some exceptions to this general rule in that in some districts within a SAU may also have separate scales. The scale for each student can be uniquely identified by doing the following:
 - a. For each student, obtain in the standard setting data file the value of the following variables: *District_Name* and/or *District_ID*, *Scale_Year*, *Scale_Grade*, and *Scale_Subject*;
 - b. Identifying the single row in the *PACE Entity Master* data file that has those same values for the same variables; and
 - c. Extracting from that row the value of the variable/column labeled *Scale_ID*.
2. Saving the *Scale_ID* to the appropriate row of the standard setting data file.

3. For each scale, do the following:
 - a. For each achievement level, identify whether the scale has at least one teacher judgment rating in that level (1) or not (0);
 - b. Create a four-bit string (*HasX*) combining the 0/1 designations from the previous step with the left-most indicating presence/absence of a rating in level 1 and the right-most indicating presence/absence of a rating in level 4 (e.g., 0110 would indicate ratings in levels 2 and 3 but no ratings in levels 1 and 4);
 - c. Using the four-bit string identified in the prior step, follow the rules for calculation given in Table 4 which shows three calculations in order (i.e., first calculation, second calculation, third calculation) covering three cut scores that correspond to the four-bit string. For this table, the names of variables are explained in Table 3 and *cut(...)* represents estimating the logistic regression described above and, if the results converge and do not predict higher achievement levels for lower scoring students, the mean competency score at which the probability of being in a higher category passes 50 percent. The cut score is identified as the mean competency score with the lowest value from 10,000 equally separated values from the minimum possible competency score to the maximum possible competency score with a probability greater than or equal to 50%. The order of calculations prioritizes calculation of the cut score between levels 2 and 3, followed by the cut score between levels 1 and 2, followed by the cut score between levels 3 and 4. Where there are insufficient data to calculate a cut score, the others are calculated first, so there may be some different orderings to reflect this caveat.
 - d. If any given cut score was problematic, it should remain uncalculated to wait for the next step.
4. For each scale with at least one cut score where the logistic regression was problematic, do the following:
 - a. Create a three-bit string (*Needed*) identifying for each cut score whether the cut score calculation was problematic (for example, "011" indicates that the cut score between levels 1 and 2 was successfully calculated, but the cut scores between levels 2 and 3 and levels 3 and 4 were problematic).
 - b. Using the three-bit string (*Needed*) identified in the prior step, follow the rules for calculation given in the corresponding row of Table 5 (which shows up to three ordered calculations; i.e., first calculation, second calculation, third calculation).

Table 3.

Explanation of variables used in business rules.

Full	Description
Cut12	Scale-specific cut score between levels 1 and 2
Cut23	Scale-specific cut score between levels 1 and 3
Cut34	Scale-specific cut score between levels 3 and 4
MinPoss CS	Scale-specific minimum possible competency score (or LOSS when LOSS = <i>Lowest Observable Scale Score</i>)
MaxPos sCS	Scale-specific maximum possible competency score (or HOSS when HOSS = <i>Highest Observable Scale Score</i>)
MinObs MCS	Scale-specific minimum attained mean competency score (or LOSS when LOSS = <i>Lowest Observed Scale Score</i>)
MaxObs MCS	Scale-specific maximum attained mean competency score (or HOSS when HOSS = <i>Highest Observed Scale Score</i>)
Has1	Scale has at least one student in achievement level 1 as judged by teacher in the dummy-variable form [0 1]
Has2	Scale has at least one student in achievement level 2 as judged by teacher in the dummy-variable form [0 1]
Has3	Scale has at least one student in achievement level 3 as judged by teacher in the dummy-variable form [0 1]
Has4	Scale has at least one student in achievement level 4 as judged by teacher in the dummy-variable form [0 1]
HasX	As-character concatenation of Scale_HasAL1, Scale_HasAL2, Scale_HasAL3, and Scale_HasAL4
AL	Student achievement level as judged by teacher at the end of the year (1, 2, 3, or 4)
Met2	Student achievement is at the end of the year judged by the teacher to at or above achievement level 2 (1) or not (0)
Met3	Student achievement is at the end of the year judged by the teacher to be in achievement level 3 or 4 (1) versus achievement level 1 or 2 (0)
Met4	Student achievement is at the end of the year judged by the teacher to be in achievement level 4 (1) versus achievement level 1, 2, or 3 (0)
MCS	Student mean competency score at the end of the year
'12'	Parameter indicating that the cut score between achievement levels 1 and 2 should be calculated

'23'	Parameter indicating that the cut score between achievement levels 2 and 3 should be calculated
'34'	Parameter indicating that the cut score between achievement levels 3 and 4 should be calculated

Table 4.

Business rules for calculating cut scores based on presence or absence of teacher judgments in each category (Step 1 level).

HasX	First Calculation	Second Calculation	Third Calculation
0001	$Cut23 \leftarrow (Cut12 + Cut34) / 2$	$Cut34 \leftarrow MinObsMCS$	$Cut12 \leftarrow MinPossCS + (Cut34 - MinPossCS) / 3$
0010	$Cut34 \leftarrow MaxObsMCS$	$Cut12 \leftarrow MinPossCS + (Cut23 - MinPossCS) / 2$	$Cut23 \leftarrow MinObsMCS$
0100	$Cut23 \leftarrow MaxObsMCS$	$Cut12 \leftarrow MinObsMCS$	$Cut34 \leftarrow (Cut23 + MaxPossCS) / 2$
1000	$Cut12 \leftarrow MaxObsMCS$	$Cut23 \leftarrow Cut12 + (MaxPossCS - Cut12) / 3$	$Cut34 \leftarrow Cut34 \leftarrow (Cut23 + MaxPossCS) / 2$
0011	$Cut23 \leftarrow (Cut12 + Cut34) / 2$	$Cut34 \leftarrow cut('34', Met4, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow MinPossCS + (Cut34 - MinPossCS) / 3$
0101	$Cut23 \leftarrow (Cut12 + Cut34) / 2$	$Cut34 \leftarrow cut('34', Met4, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow MinPossCS + (Cut34 - MinPossCS) / 3$
0110	$Cut23 \leftarrow cut('23', Met3, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow MinPossCS + (Cut23 - MinPossCS) / 2$	$Cut34 \leftarrow (Cut23 + MaxPossCS) / 2$
1001	$Cut23 \leftarrow (Cut12 + Cut34) / 2$	$Cut34 \leftarrow cut('34', Met4, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow MinPossCS + (Cut34 - MinPossCS) / 3$
1010	$Cut23 \leftarrow cut('23', Met3, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow MinPossCS + (Cut23 - MinPossCS) / 2$	$Cut34 \leftarrow (Cut23 + MaxPossCS) / 2$
1100	$Cut12 \leftarrow cut('12', Met2, Cut12, Cut23, Cut34, MCS)$	$Cut23 \leftarrow MaxObsMCS$	$Cut34 \leftarrow (Cut23 + MaxPossCS) / 2$
0111	$Cut34 \leftarrow cut('34', Met4, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow MinPossCS + (Cut23 - MinPossCS) / 2$	$Cut23 \leftarrow cut('23', Met3, Cut12, Cut23, Cut34, MCS)$
1011	$Cut34 \leftarrow cut('34', Met4, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow MinPossCS + (Cut23 - MinPossCS) / 2$	$Cut23 \leftarrow cut('23', Met3, Cut12, Cut23, Cut34, MCS)$
1101	$Cut12 \leftarrow cut('12', Met2, Cut12, Cut23, Cut34, MCS)$	$Cut34 \leftarrow cut('34', Met4, Cut12, Cut23, Cut34, MCS)$	$Cut23 \leftarrow (Cut12 + Cut34) / 2$
1110	$Cut23 \leftarrow cut('23', Met3, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow cut('12', Met2, Cut12, Cut23, Cut34, MCS)$	$Cut34 \leftarrow (Cut23 + MaxPossCS) / 2$
1111	$Cut23 \leftarrow cut('23', Met3, Cut12, Cut23, Cut34, MCS)$	$Cut12 \leftarrow cut('12', Met2, Cut12, Cut23, Cut34, MCS)$	$Cut34 \leftarrow cut('34', Met4, Cut12, Cut23, Cut34, MCS)$

Table 5.

Business rules for calculating cut scores based on whether each logistic regression had problematic results (Step 2 level).

Neede d	Cut12	Cut23	Cut34
------------	-------	-------	-------

001			Cut34 <- MaxPossCS
010		$\text{Cut23} <- (\text{Cut12} + \text{Cut34}) / 2$	
011		$\text{Cut23} <- (\text{Cut12} + \text{MaxPossCS}) / 3$	Cut34 <- MaxPossCS
100	$\text{Cut12} <- (\text{MinPossCS} + \text{Cut23}) / 2$		
101	$\text{Cut12} <- (\text{MinPossCS} + \text{Cut23}) / 2$		Cut34 <- MaxPossCS
110	$\text{Cut12} <- (\text{MinPossCS} + \text{MinPossCS} + \text{Cut34}) / 3$	$\text{Cut23} <- (\text{MinPossCS} + \text{Cut34}) / 2$	
111	$\text{Cut12} <- (\text{MinPossCS} + \text{Cut23}) / 2$	$\text{Cut23} <- (\text{MinPossCS} + \text{MaxPossCS}) / 2$	Cut34 <- MaxPossCS

Application of Cut Score Calculation Business Rules

The results of the contrasting groups standard setting analyses with applied cut score calculation business rules is shown in Appendix C. If a cut score calculation business rule was applied it can be found under “Result12”, “Result23” or “Result34”.

- “<Estimated successfully>” means that no business rule was applied to produce a cut score.
- “Set via step 1 rule>” means that the absence of a teacher judgment survey rating in a particular achievement level necessitated the application of the cut score calculation business rules found in Table 4 above.
- “<Set via step 2 rule after estimation failed to converge>” means that the logistic regression did not estimate successfully (due to small sample size, for example) and therefore the cut score calculation business rules found in Table 5 above were applied.

Cross-District Comparability Analyses

In order to account for differences in the relative stringency and leniency in teacher scoring across the PACE districts, the PACE innovative assessment system uses common performance tasks across districts. These common tasks allow us to evaluate the degree of comparability in local scoring. These analyses rest on two foundational assumptions: 1) that patterns in scoring for the common tasks is representative of district relative stringency or leniency of local scoring represented in end of year competency scores, and 2) the degree of relative stringency or leniency of scoring is consistent within district for a particular grade and subject area.

Cross-District Calibration Audit

The calibration audit is intended to uncover differences in scoring between districts that can be used to support decision-making about any adjustments to cut scores that may be needed due to systematic cross-district differences in scoring, which violates one of the foundational assumptions noted above. The scores of student work on PACE performance tasks that result from this audit serves as the “calibration weights” so that more generalized inferences about relative leniency or stringency of district scoring practices can be made.

On July 16, 2019, teachers and leaders from the PACE districts participated in the calibration audit. We also conducted online, distributed scoring of the calibration audit ahead of the July in-person event with approximately 40 teachers from across PACE districts who participated. Participating teachers volunteered based upon their experience in attending the in-person calibration event in the past.

The calibration audit uses a consensus scoring method that involves pairing teachers together, each representing different districts, to score student work samples. The student work samples were gathered for each of the PACE common performance tasks from the districts participating in the 2018-19 school year. Both judges within each pair were asked to individually score their

assigned samples of student work. Working through the work samples one at a time, the judges discussed their individual scores and then agreed on a “consensus score”. If consensus could not be reached, an expert scorer (who did not have affiliation with any particular district) decided on the appropriate consensus score. There were five cases in math and one case in ELA this year where an expert scorer was needed to moderate one rubric dimension.

Cross-District Comparability Results

An average across the rubric dimensions from the consensus scorers was matched with an average across the rubric dimensions from the teacher-given local scores using Student ID, district, grade, and subject. This matching resulted in 1,493 total students with both consensus scores and local scores for the common task in grades 3-7. High school is not included because federally-required high school annual determinations in New Hampshire are supplied by students’ scores on the SAT. The distribution of these students across grades, subjects, and district is provided in the table on the next page. There are some cells with very few students (N<10) because these districts have small student populations. This causes challenges for our ability to evaluate comparability with any degree of precision. Due to data issues, the grade 8 science results are still pending.

Table 6.

Number of Matched Students by Grade, Subject, and District

Subj	Gr	Amherst	Bethlehem	Concord	Conway	Epping	Laconia	Monroe	Newport	Rochester	Sanborn	SAU23	Seacoast	Total
ELA	4	NA	13	19	18	20	13	4	20	17	20	19	20	183
	5	20	20	10	17	20	19	6	20	20	19	17	19	207
	6	18	15	20	20	20	NA	6	19	20	20	16	20	194
	7	19	NA	23	NA	20	NA	*	24	20	19	14	17	156
Math	3	NA	9	19	20	20	20	11	21	21	19	20	19	199
	5	21	20	22	20	20	*	2	20	20	20	13	19	197
	6	20	15	17	20	20	NA	6	19	20	20	20	20	197
	7	20	NA	22	NA	19	NA	8	19	20	19	13	20	160
Total		118	92	152	115	159	52	43	162	158	156	132	154	1493

Note. NA=district is not participating in NH PACE in that grade/subject. *Data issue. Cannot calculate analyses.

To detect any systematic discrepancies in the relatively leniency and stringency of district scoring, we calculated a mean deviation index. This index is the mean difference between the consensus score and teacher local score across all student work samples for each district as calculated by the following, for District k:

$$Deviation_k = \frac{\sum_i^n (teacher_i - consensus_i)}{n_k}$$

Using this index, a negative mean deviation would indicate systematic underestimation of student scores by classroom teachers (i.e., district stringency), and positive mean deviation scores would indicate systematic overestimation of student scores by classroom teachers (i.e., district leniency). The values of the deviation metric are on the scale of the rubric points. Table 7 below shows the mean observed deviation by district.

Table 7.
Mean deviation by district along with other descriptive statistics

	N	Mean Deviation	SD	SE	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
Amherst	118	0.3302	0.63457	0.05842	0.2145	0.4459	-1.25	2.33
Bethlehem	92	0.1911	0.66235	0.06905	0.0539	0.3282	-1.00	2.00
Concord	152	0.1293	0.55574	0.04508	0.0402	0.2183	-1.50	2.00
Conway	115	0.1453	0.62268	0.05806	0.0302	0.2603	-1.00	2.00
Epping	159	0.0736	0.52287	0.04147	-0.0083	0.1555	-1.33	2.00
Laconia	52	-0.0706	0.44798	0.06212	-0.1953	0.0541	-1.00	1.00
Monroe	43	0.3961	0.56340	0.08592	0.2227	0.5695	-1.20	2.00
Newport	162	0.3103	0.51905	0.04078	0.2298	0.3908	-1.00	1.66
Rochester	158	0.1654	0.57338	0.04562	0.0753	0.2555	-1.50	2.00
Sanborn	156	0.1922	0.59142	0.04735	0.0986	0.2857	-1.25	2.50
SAU23	132	0.4079	0.54083	0.04707	0.3148	0.5010	-1.40	1.66
Seacoast	154	0.1052	0.51312	0.04135	0.0235	0.1869	-1.33	1.67
Total	1493	0.1972	0.57472	0.01487	0.1680	0.2264	-1.50	2.50

Positive scores indicate a systematic overestimation of common task scores by the classroom teachers. If they are all high it is not necessarily problematic from a comparability perspective, we are just looking for differences among the districts in mean deviation. Figure 1 uses a boxplot to illustrate these differences in mean deviation by district.

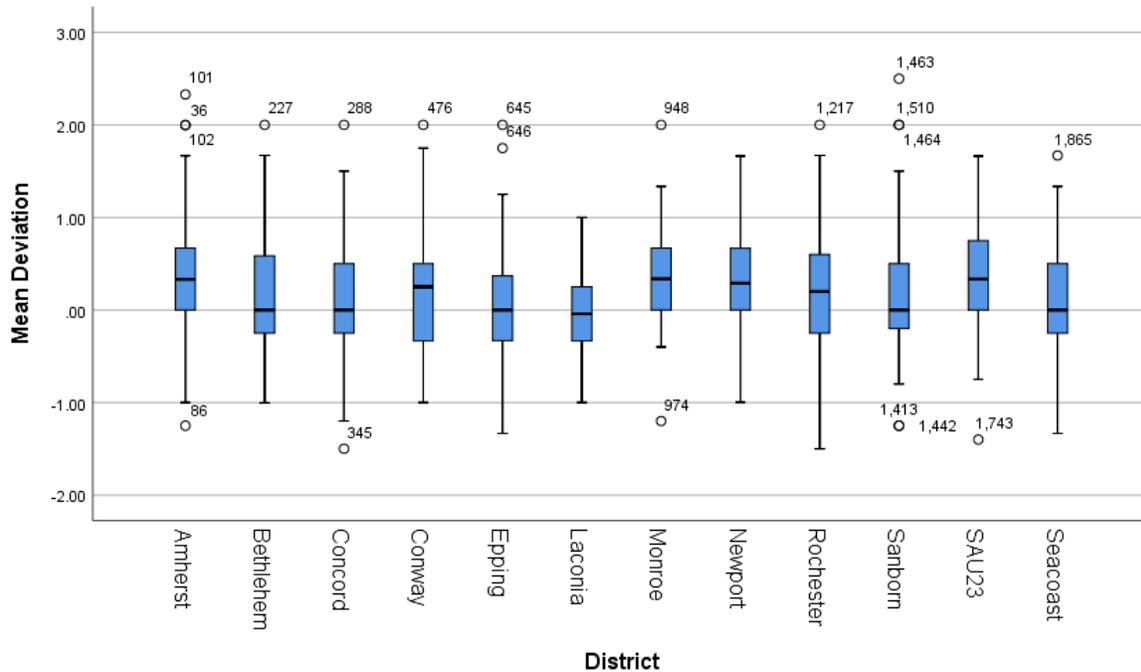


Figure 1. Boxplot illustrating mean deviation by district (SAU)

SAU23 has a mean deviation score slightly higher than the other districts (0.40), which means that teachers from that district tended to score more leniently than teachers from other districts. Post-hoc analyses with a Bonferroni correction revealed that SAU23’s marginal deviations are significantly different at the 0.05-alpha level from six other districts and is flagged for further review.

A three-factor analysis of variance reveals a significant 3-way interaction for district, by grade, by subject combinations (see Table 8). This means we cannot justify any unilateral adjustments to any one districts’ cut scores across the board. Instead, more nuanced decisions must be made based on follow-up analyses.

Table 8.
ANOVA – District by grade by subject

Source	df	F	Sig.	Partial Eta Squared
District	11	8.031	0.000	0.059

Grade	4	10.048	0.000	0.028
Subject	1	0.530	0.467	0.000
District*Grade	37	6.702	0.000	0.150
District*Subject	10	4.662	0.000	0.032
Grade*Subject	2	1.320	0.267	0.002
District*Subject*Grade	17	3.872	0.000	0.045

Figures 2-3 below show plots of the mean deviations by district and grade for ELA and math, respectively. The numbers represented in those plots can be found in Table 10 (by district, subject and grade).

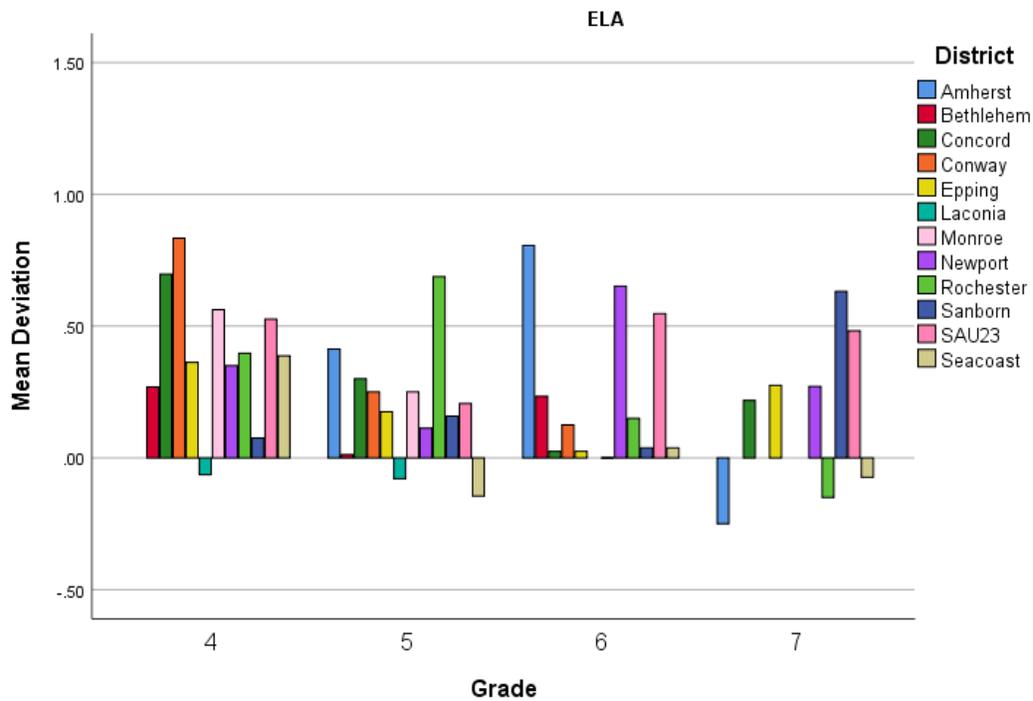


Figure 2. Mean Deviations by District and Grade for ELA

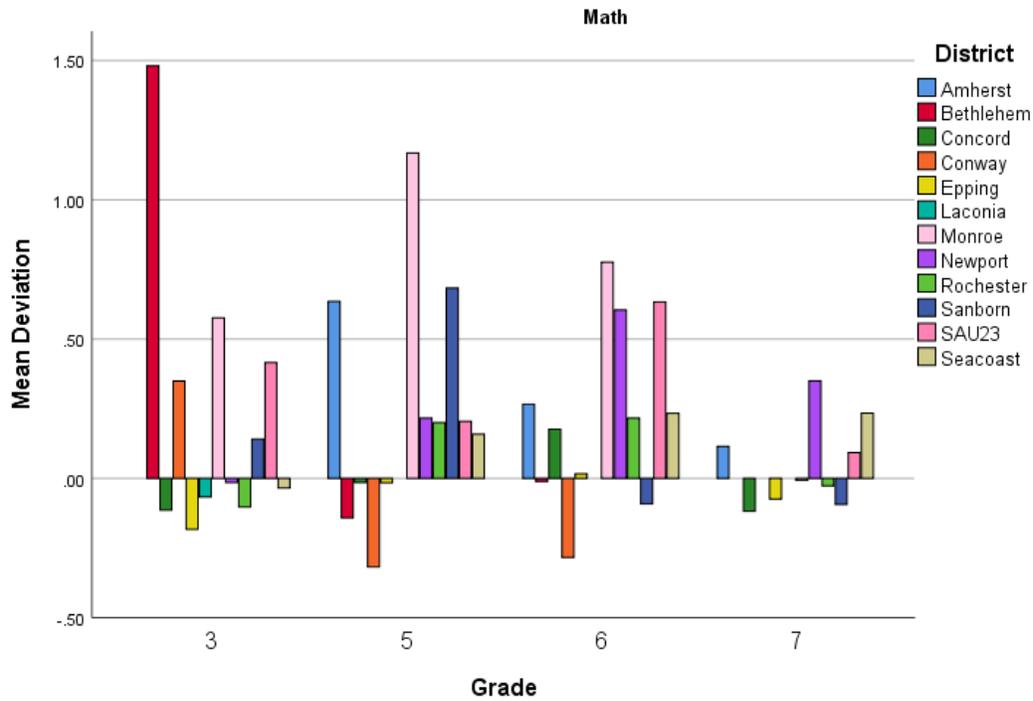


Figure 3. Mean Deviations by District and Grade for Math

Table 9. Mean deviations by subject and grade

Subject	Gr	Mean Deviation	N	SD	+0.5	-0.5
ELA	4	0.4012	183	0.61372	0.90	-0.10
	5	0.1884	207	0.49464	0.69	-0.31
	6	0.2429	194	0.57207	0.74	-0.26
	7	0.1715	156	0.65734	0.67	-0.33
<i>ELA average</i>		<i>0.2517</i>	<i>740</i>	<i>0.58745</i>		
Math	3	0.1374	199	0.58112	0.64	-0.36
	5	0.1700	197	0.63298	0.67	-0.33
	6	0.1969	197	0.53367	0.70	-0.30
	7	0.0529	160	0.43561	0.55	-0.45
<i>Math average</i>		<i>0.1435</i>	<i>753</i>	<i>0.55712</i>		

Note. ± 0.50 -points = half-point difference of subject and grade level average on the scale of the rubric

Overall, ELA teachers tended to be more lenient than consensus scorers across subject areas (ELA average=0.25, SD=0.59; Math average=0.14, SD=0.56). Table 10 disaggregates the mean

deviations by district, subject and grade. Yellow highlights indicate where the mean deviation is ± 0.50 -points different than the subject and grade level average deviation shown in Table 9. Cells with less than 10 students are highlighted to indicate the lack of precision with those deviations and the associated uncertainty. SAU23 mean deviations by subject and grade shown below indicate that there is no need for further action since all mean deviations are within ± 0.50 -points of the subject and grade level average on the scale of the rubric.

Table 10. Mean deviations by district, subject area, and grade

District	Subject	Gr	Mean Deviation	N	SD
Amherst	ELA	5	0.41	20	0.35610
		6	0.81	18	0.60970
		7	-0.25	19	0.65085
	Math	5	0.63	21	0.75781
		6	0.27	20	0.33502
		7	0.12	20	0.43441
	Bethlehem	ELA	4	0.27	13
5			0.01	20	0.48310
6			0.23	15	0.46739
Math		3	1.48	9	0.29535
		5	-0.14	20	0.62948
		6	-0.01	15	0.41013
Concord	ELA	4	0.70	19	0.55640
		5	0.30	10	0.45338
		6	0.03	20	0.68777
		7	0.22	23	0.53462
	Math	3	-0.11	19	0.37729
		5	-0.01	22	0.46529
		6	0.18	17	0.44368
Conway	ELA	4	0.83	18	0.69133
		5	0.25	17	0.43301

		6	0.13	20	0.46946
	Math	3	0.35	20	0.42519
		5	-0.32	20	0.48881
		6	-0.28	20	0.42249
Epping	ELA	4	0.36	20	0.67607
		5	0.18	20	0.53250
		6	0.03	20	0.44352
		7	0.28	20	0.57297
	Math	3	-0.18	20	0.38277
		5	-0.02	20	0.36559
		6	0.02	20	0.59723
		7	-0.07	19	0.36223
Laconia	ELA	4	-0.06	13	0.57850
		5	-0.08	19	0.37317
	Math	3	-0.07	20	0.44191
Monroe	ELA	4	0.56	4	0.12500
		5	0.25	6	0.38730
		6	0.00	6	0.22361
	Math	3	0.58	11	0.45035
		5	1.17	2	1.17615
		6	0.78	6	0.54393
		7	-0.01	8	0.59788
Newport	ELA	4	0.35	20	0.59272
		5	0.11	20	0.30859
		6	0.65	19	0.47795
		7	0.27	24	0.49955
	Math	3	-0.02	21	0.51043
		5	0.22	20	0.49899

		6	0.60	19	0.53096
		7	0.35	19	0.40035
Rochester	ELA	4	0.40	17	0.51583
		5	0.69	20	0.54335
		6	0.15	20	0.57583
		7	-0.15	20	0.65091
	Math	3	-0.10	21	0.53315
		5	0.20	20	0.53461
		6	0.22	20	0.38275
		7	-0.03	20	0.38497
Sanborn	ELA	4	0.08	20	0.57411
		5	0.16	19	0.51512
		6	0.04	20	0.45360
		7	0.63	19	0.84314
	Math	3	0.14	19	0.50167
		5	0.68	20	0.54640
		6	-0.09	20	0.35720
		7	-0.09	19	0.27585
SAU23	ELA	4	0.53	19	0.62302
		5	0.21	17	0.38765
		6	0.55	16	0.50182
		7	0.48	14	0.49482
	Math	3	0.42	20	0.45673
		5	0.20	13	0.51917
		6	0.63	20	0.56020
		7	0.09	13	0.61976
Seacoast	ELA	4	0.39	20	0.45505
		5	-0.14	19	0.52912

	6	0.04	20	0.44629
	7	-0.07	17	0.54317
Math	3	-0.03	19	0.53204
	5	0.16	19	0.64209
	6	0.23	20	0.43408
	7	0.23	20	0.34092

Note: Yellow highlights indicate that the mean deviation is ± 0.50 -points different than the grade level average on the scale of the rubric.

The analysis of mean deviation differences by district, grade, and subject noted three areas for further review: Sanborn Grade 5 Math, Rochester Grade 5 ELA, and Amherst Grade 6 ELA. The impact analyses explained in the next section was used to examine each of these scales based on historical trends over time. Results of those investigations are as follows:

- **Sanborn Grade 5 Math:** Local scoring in this grade/subject did not appear lenient as the state test analysis showed that this grade/subject had the lowest proficiency rate of any PACE grade in Sanborn math analyses. No further action is recommended.
- **Rochester Grade 5 ELA:** Local scoring in this grade/subject did not appear lenient as the cohort and longitudinal analyses show a drop in proficiency rates from 2018 to 2019. No further action is recommended.
- **Amherst Grade 6 ELA:** Local scoring in this grade/subject did not appear lenient as the cohort analyses showed a reduction in the percent of students deemed proficient or above from 2018 to 2019 and the results for 2019 were similar to state test results in this grade/subject. No further action is recommended.

Quality Assurance Processes and Procedures

Prior to submitting the calculated cut scores as final to the NH DOE, we conducted several impact analyses to evaluate the consistency and stability of the cut scores. The purpose of these quality assurance process and procedures is to review the outcome and reasonableness of the cut scores produced using historical data to flag results that seem unlikely or unreasonable given trends over time for each scale.

Historical data from the first four years of the PACE innovative system were used alongside the 2018-19 data whenever possible (2014-15, 2015-16, 2016-17, and 2017-18). District-level impact analyses are contained in Appendix D. The five impact analyses include:

- **Amherst “Special Case” Analysis:** The Amherst school district double-tested three grade/subject combinations (Gr 6 ELA and math; Gr 7 ELA) in the 2018-19 school year using both the PACE system and the NH SAS system. This unique opportunity allows us to examine the consistency of achievement levels and proficiency classifications between the two systems.

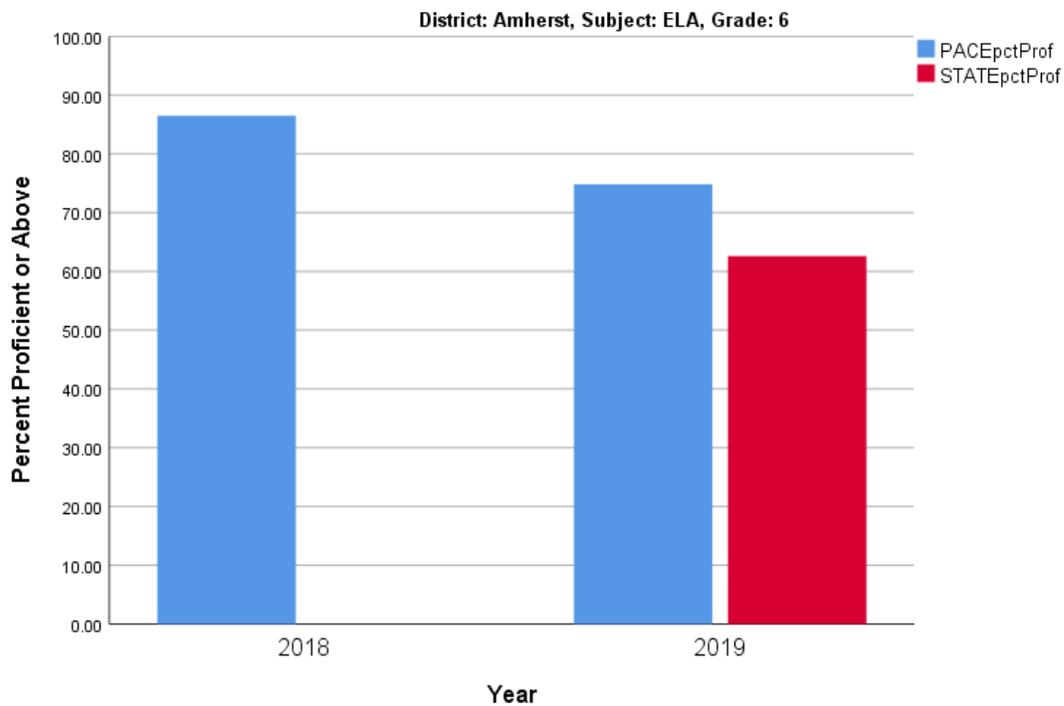
- Cohort analysis: Examined how students in a given grade/subject performed in comparison to students in the same grade/subject for the previous year and any other years of data available using percent of students proficient or above;
- Longitudinal analysis: Compared how students in a given grade performed in the previous grades (same subject) for the previous year and any other years of data available using percent of students proficient or above; and
- State test analysis: Compared proficiency rates between PACE and NH SAS in grades 3-8 using percent of students proficient or above by subject.
- Performance level analysis: Compared the percent of students in each performance level (1, 2, 3, or 4).

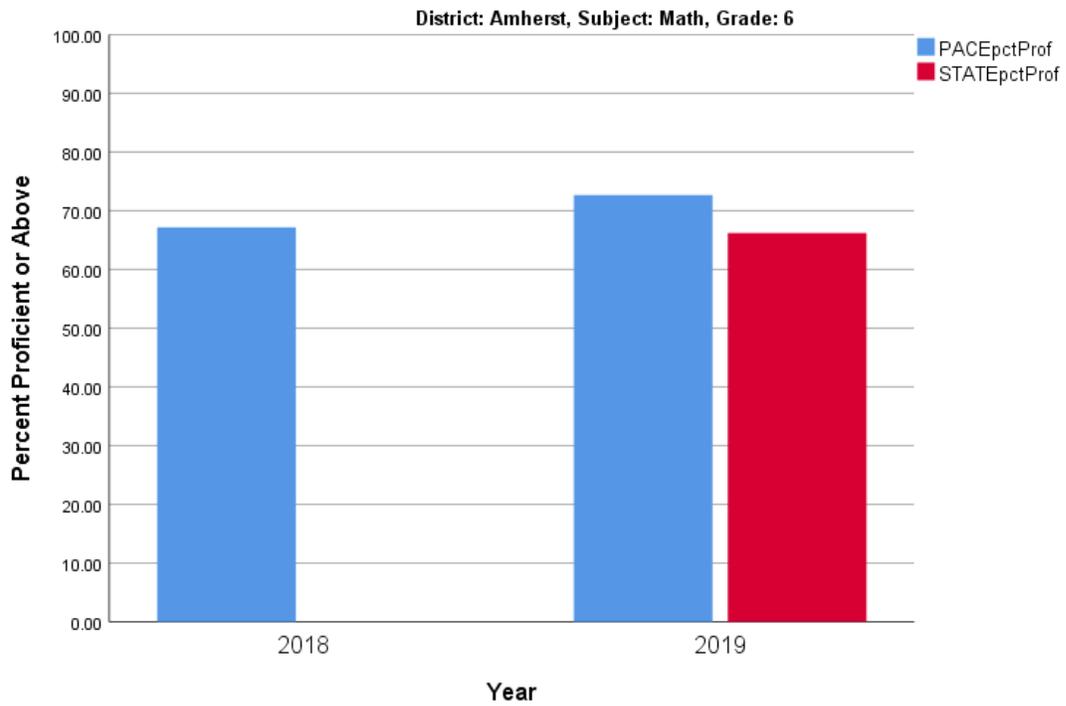
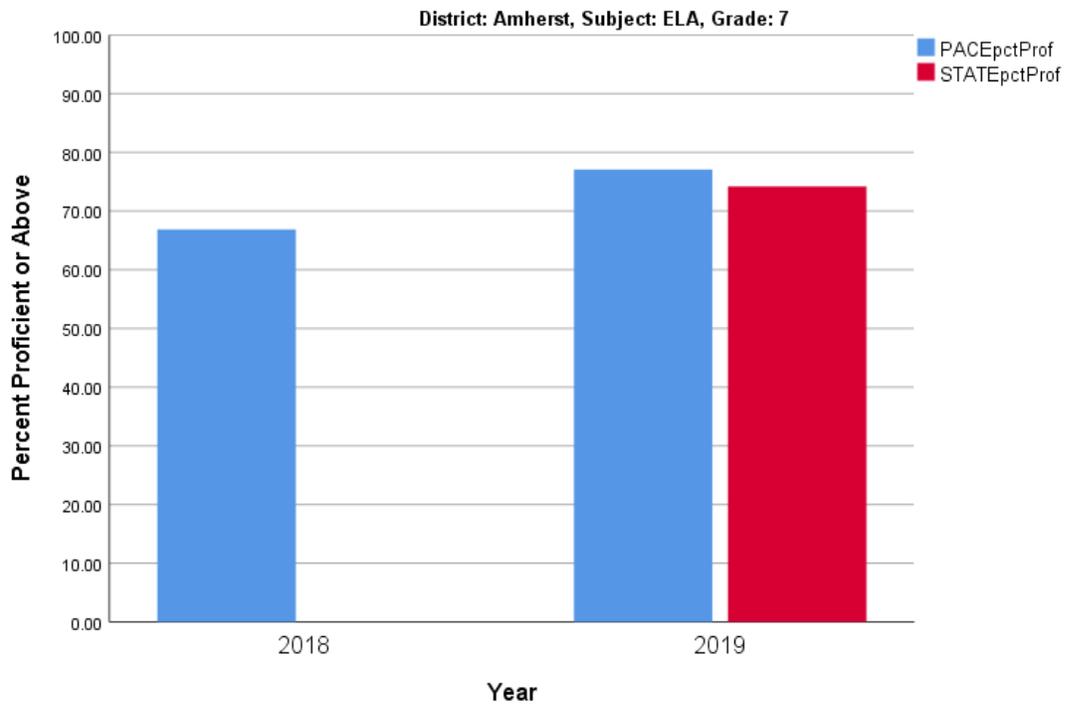
Amherst “Special Case” Analysis

We had a unique opportunity to examine our performance standards this year because Amherst chose to double-test three groups of students using both PACE and NH SAS: grade 6 ELA, grade 7 ELA, and grade 6 math. Using the cohort, longitudinal, state test, and performance level analysis below to examine results between the two assessment systems it is apparent that PACE results are slightly more lenient than the state test in that more students are deemed proficient or above in the PACE system than in the NH SAS system. For example, in grade 7 ELA the PACE proficiency rate was 77% and the NH SAS proficiency rate was 74%.

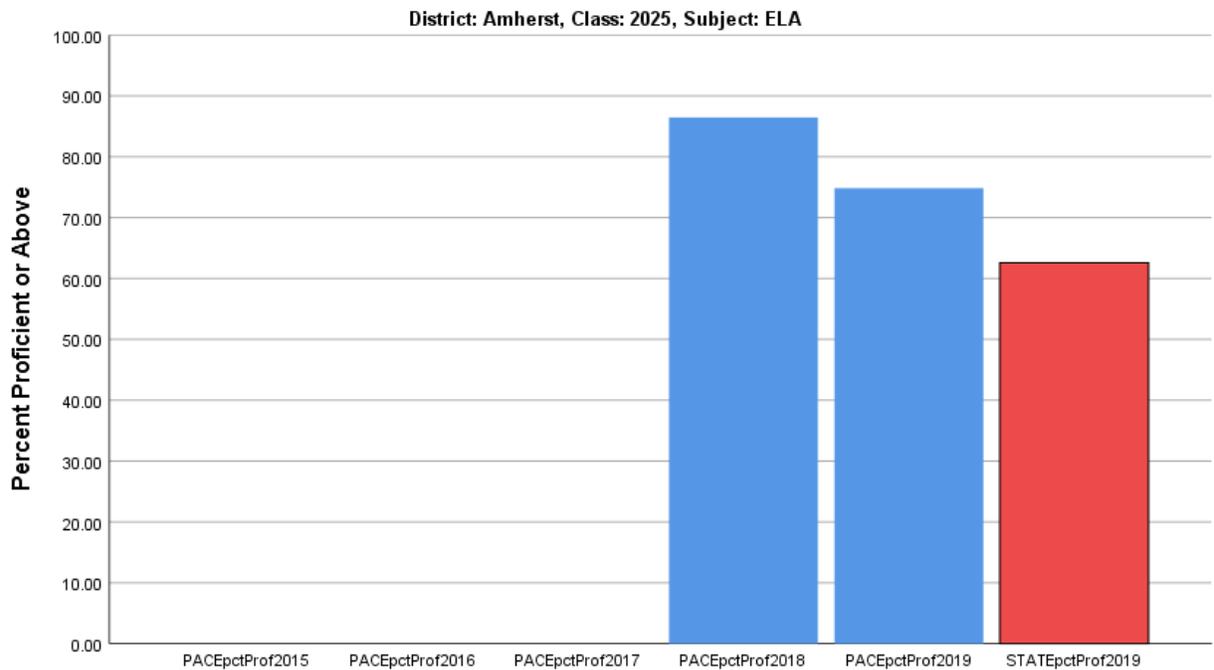
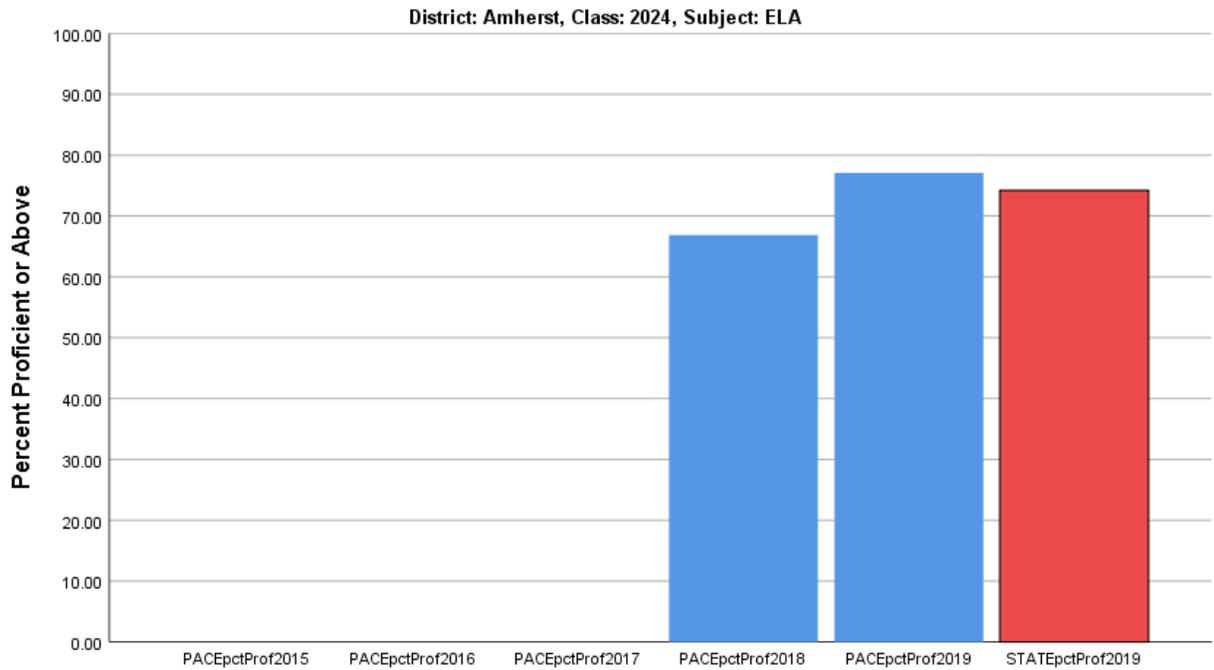
Overall these results show that the PACE standard setting methodology is robust given that we would not expect results to be exactly the same between the two assessment systems. NH SAS is a standardized test designed to create a fairly even distribution of student achievement across levels; whereas, the NH PACE system uses local assessment information and teacher judgments to set standards.

Cohort Analysis for Amherst

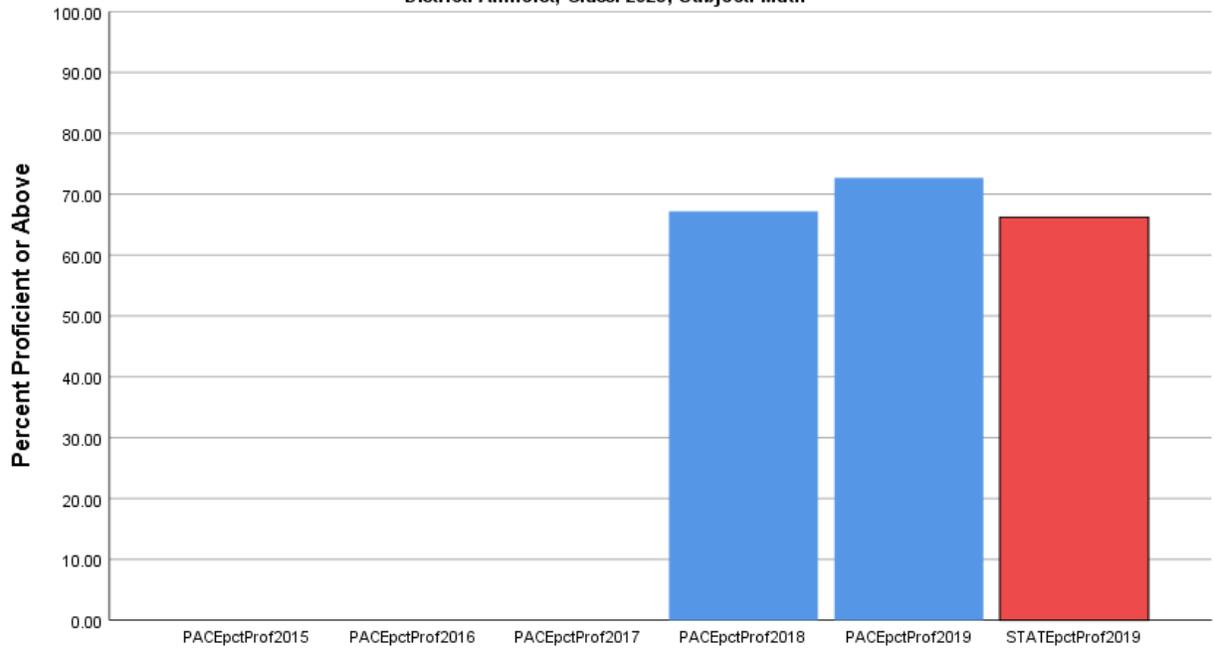




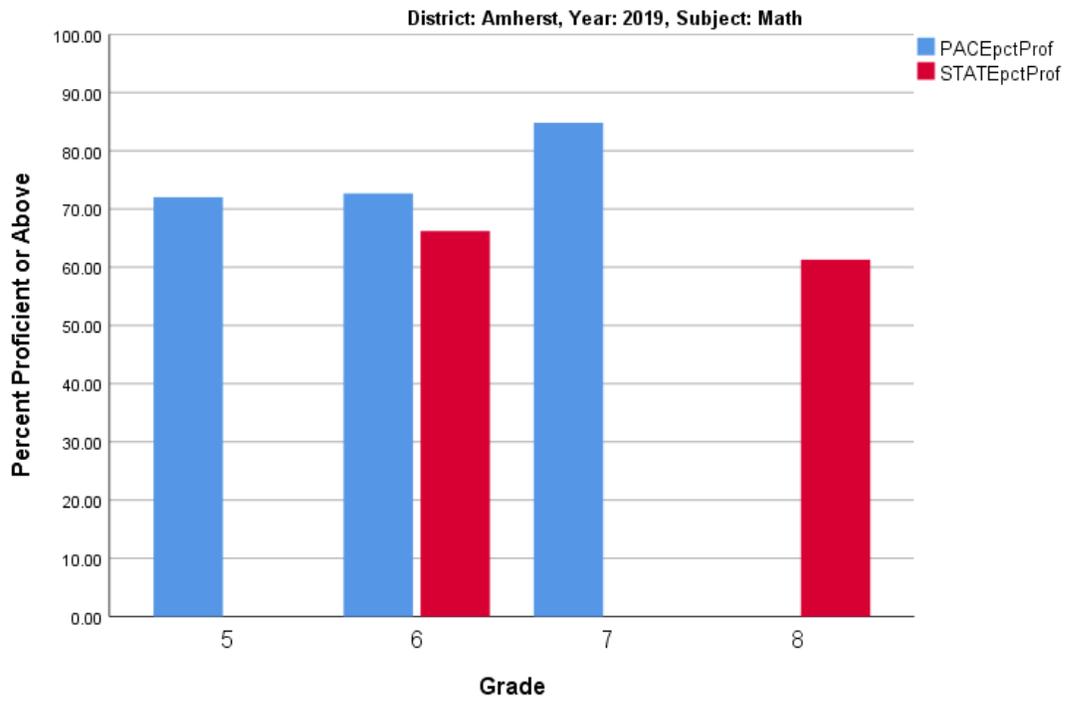
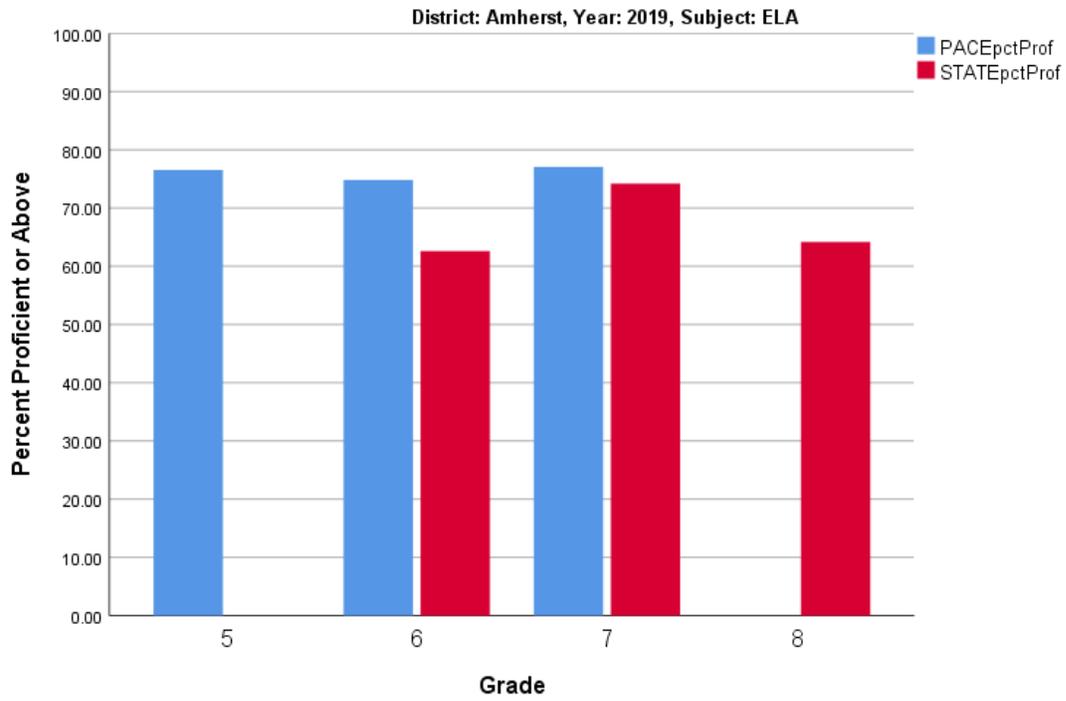
Longitudinal Analysis for Amherst



District: Amherst, Class: 2025, Subject: Math



State Test Analysis for Amherst

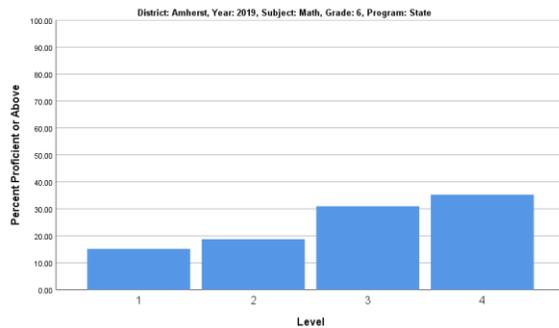
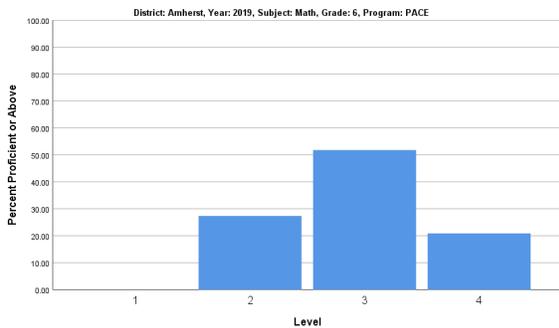
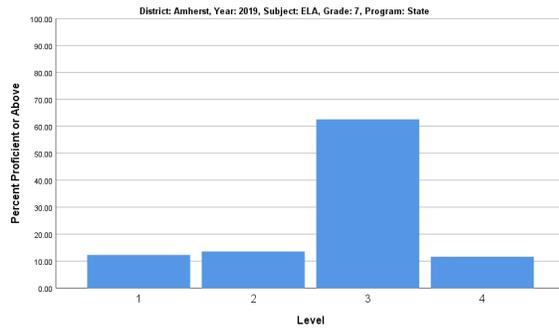
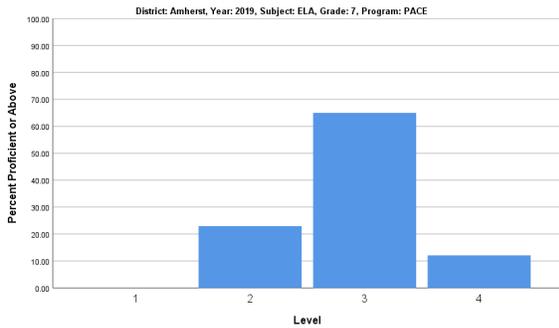
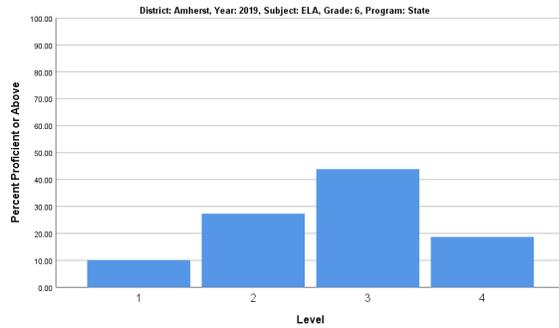
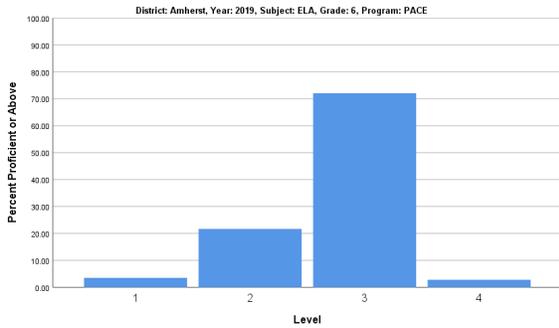


Performance Level Analysis for Amherst

The PACE performance level results are on the left-hand panels and the NH SAS performance level results are on the right-hand panels for grade 6 ELA, grade 7 ELA, and grade 6 Math, respectively.

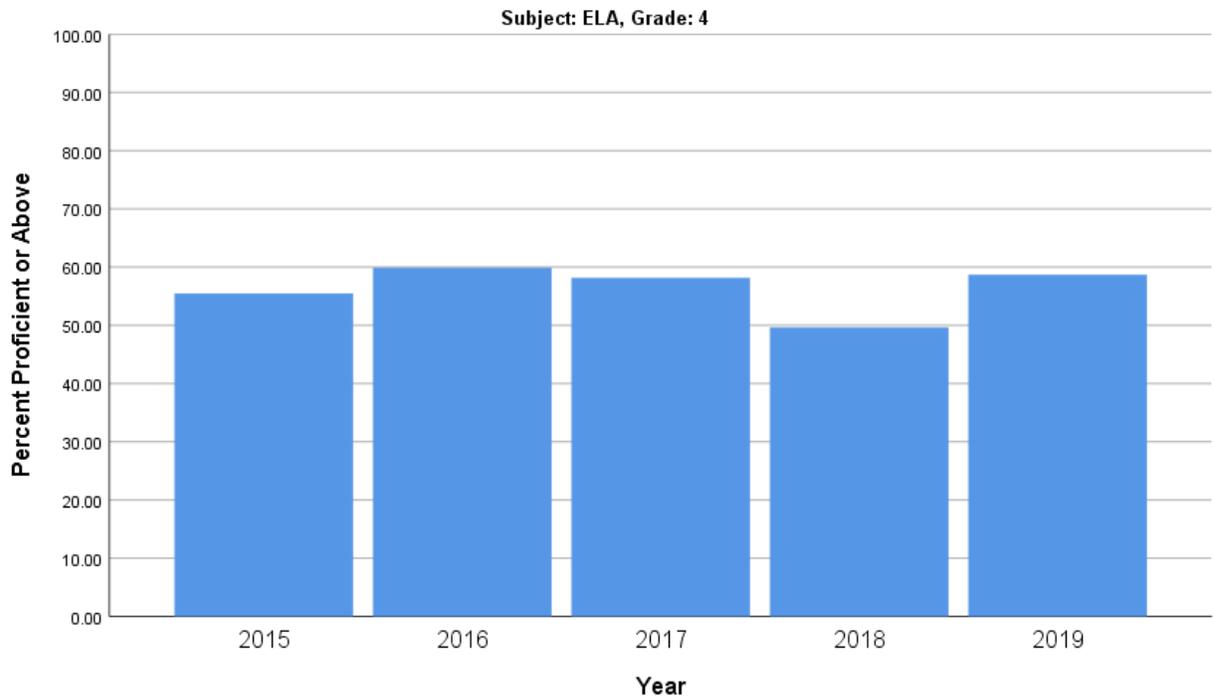
PACE Results

NH SAS Results

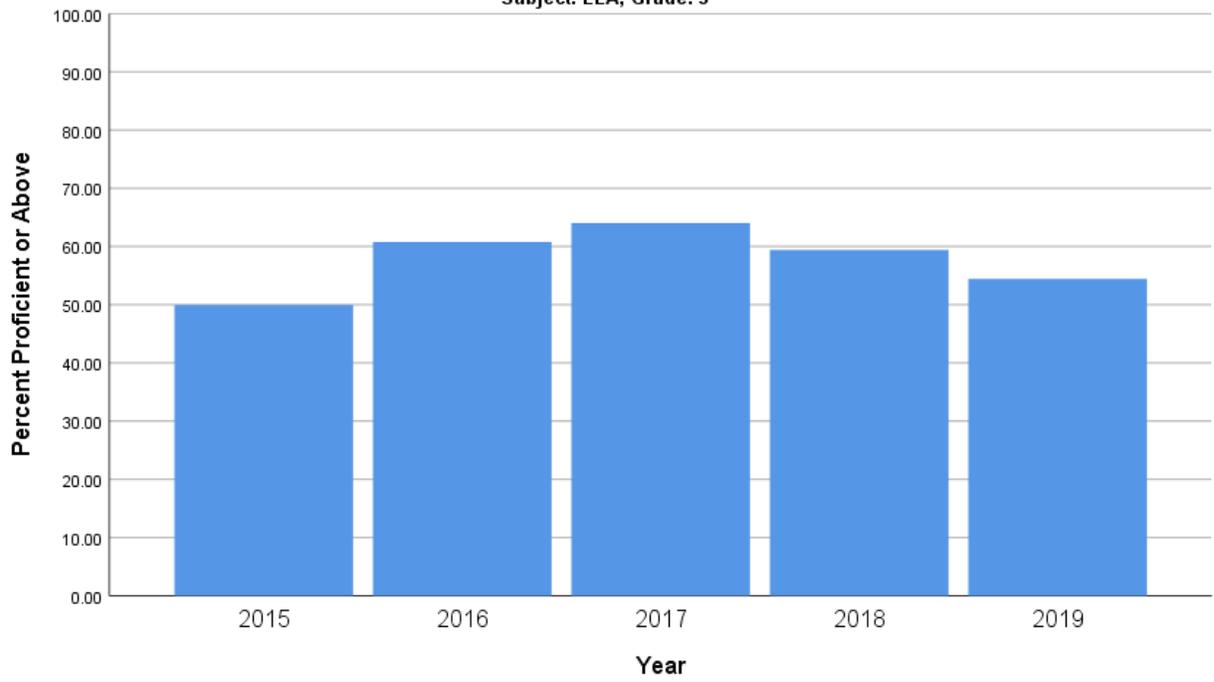


Cohort Analysis

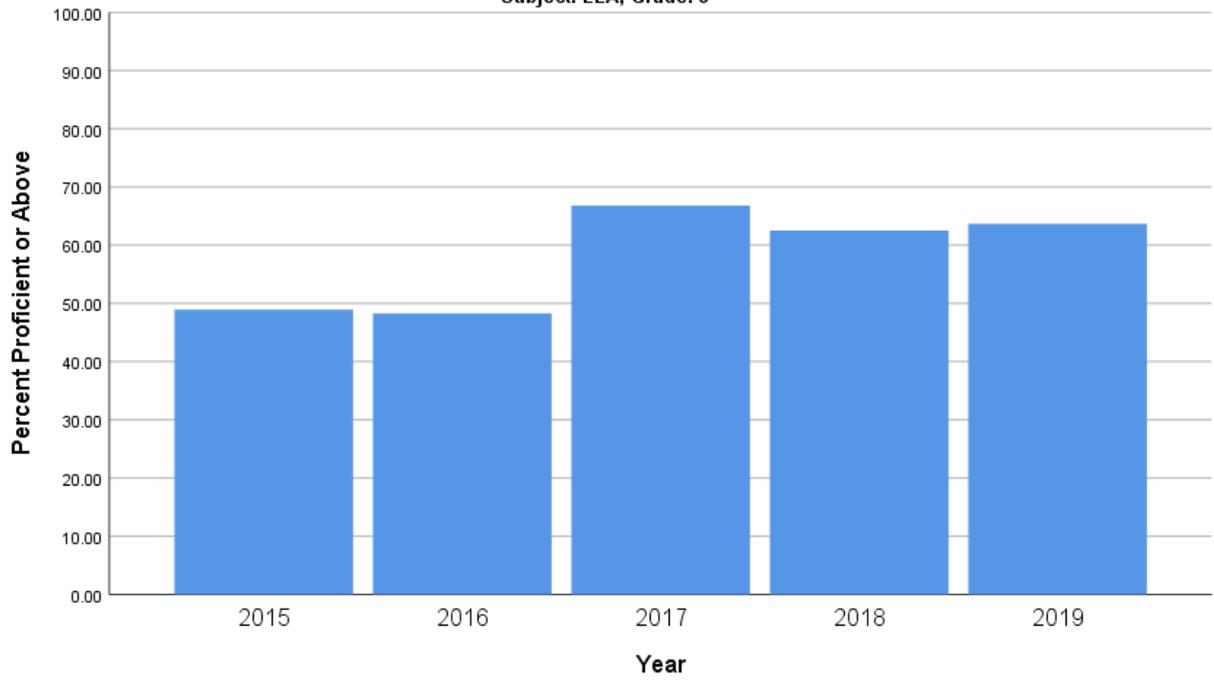
The cohort analysis compares the percent of students deemed proficient or above in PACE grade/subject areas from 2015 to 2019. Due to the design of the PACE system, the number of districts in each year changes from year to year as the project scales. There are also some years where districts drop out. This means that some variation from year to year is due to the changing composition of the cohort group.



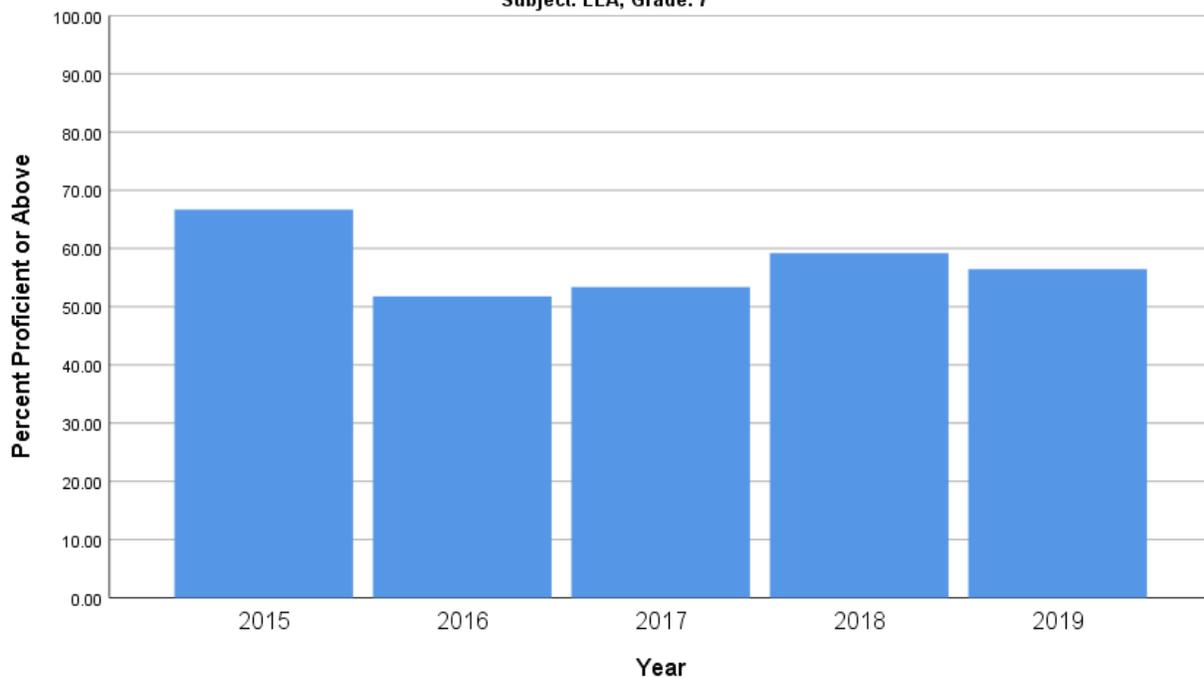
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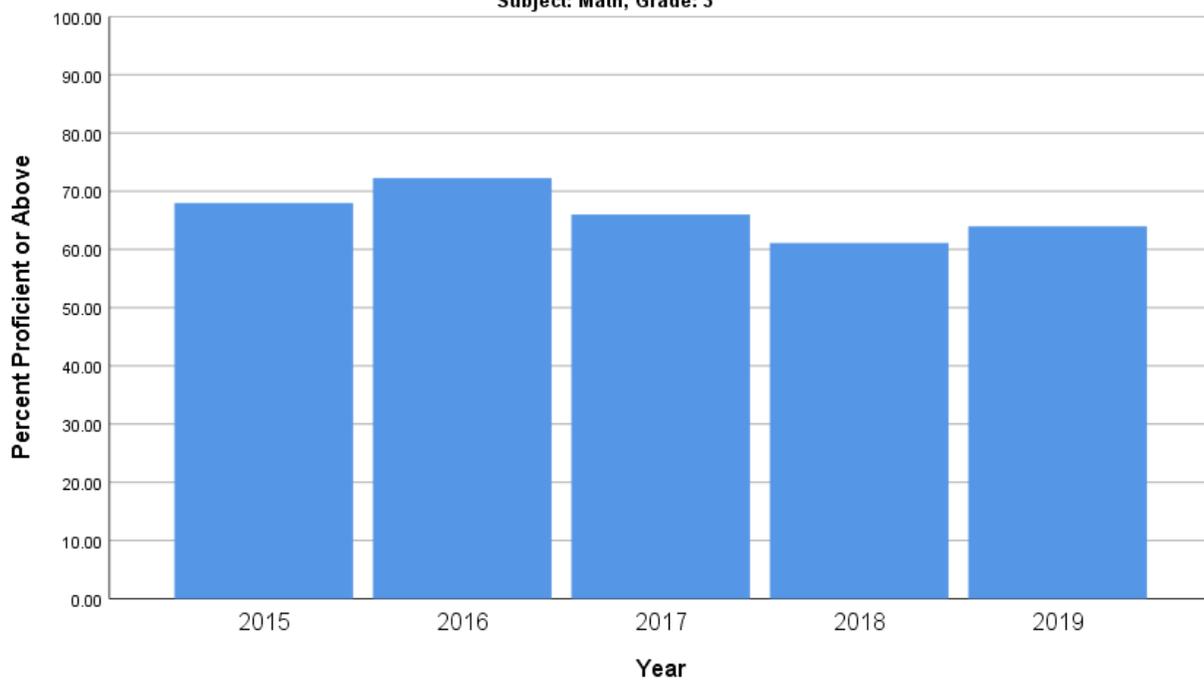
Subject: ELA, Grade: 6

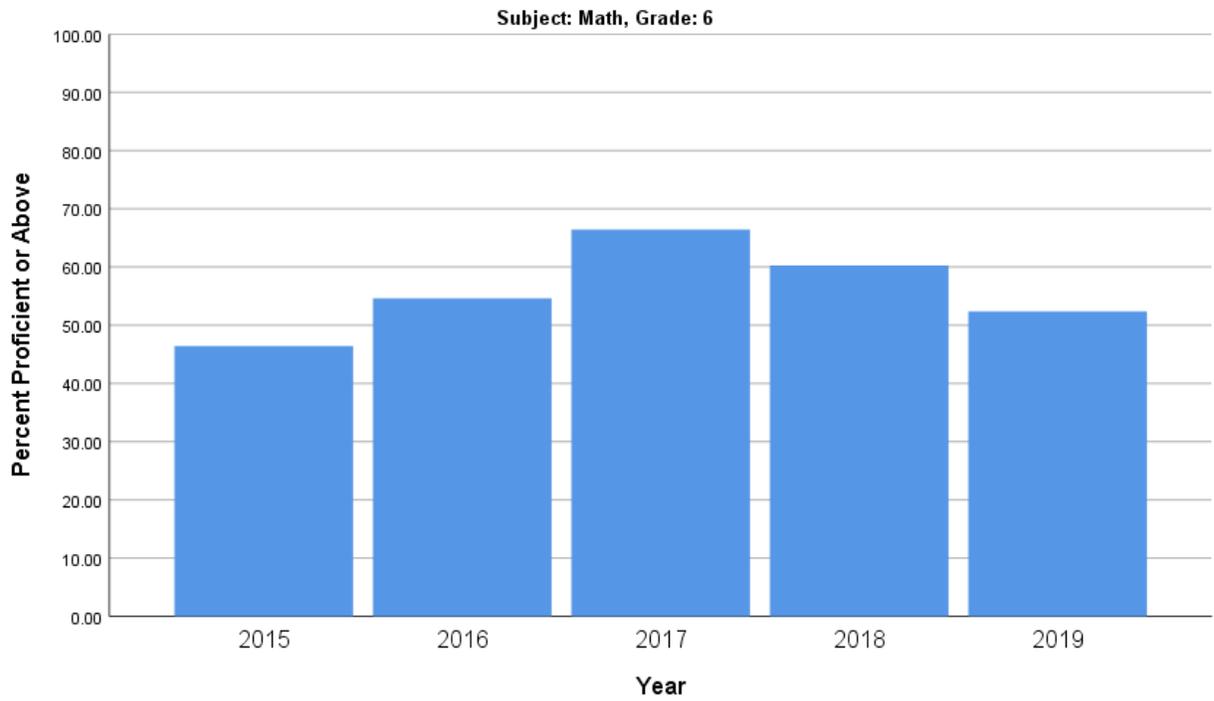
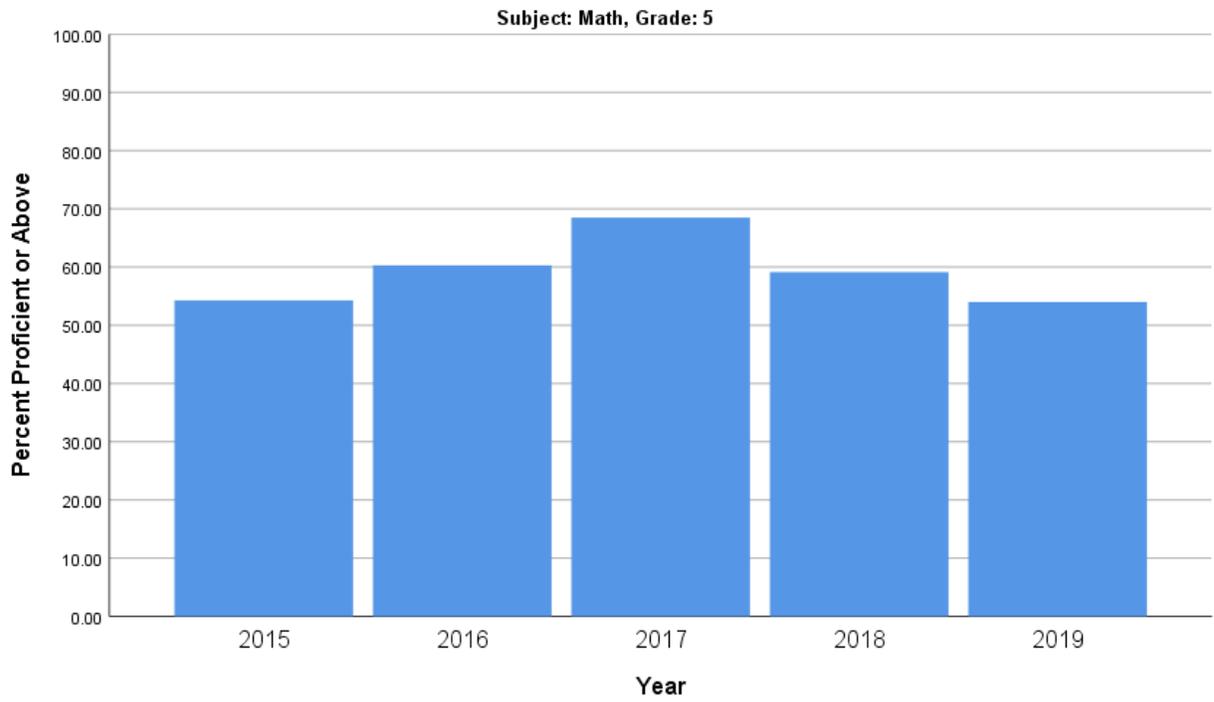


Subject: ELA, Grade: 7

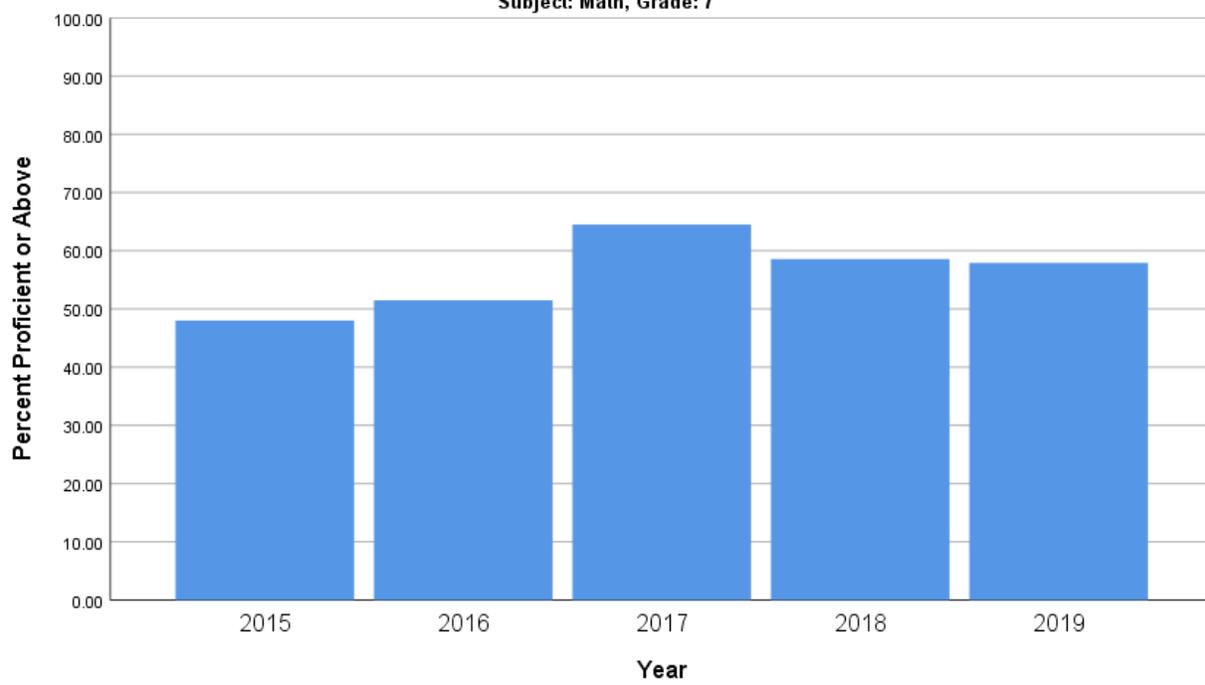


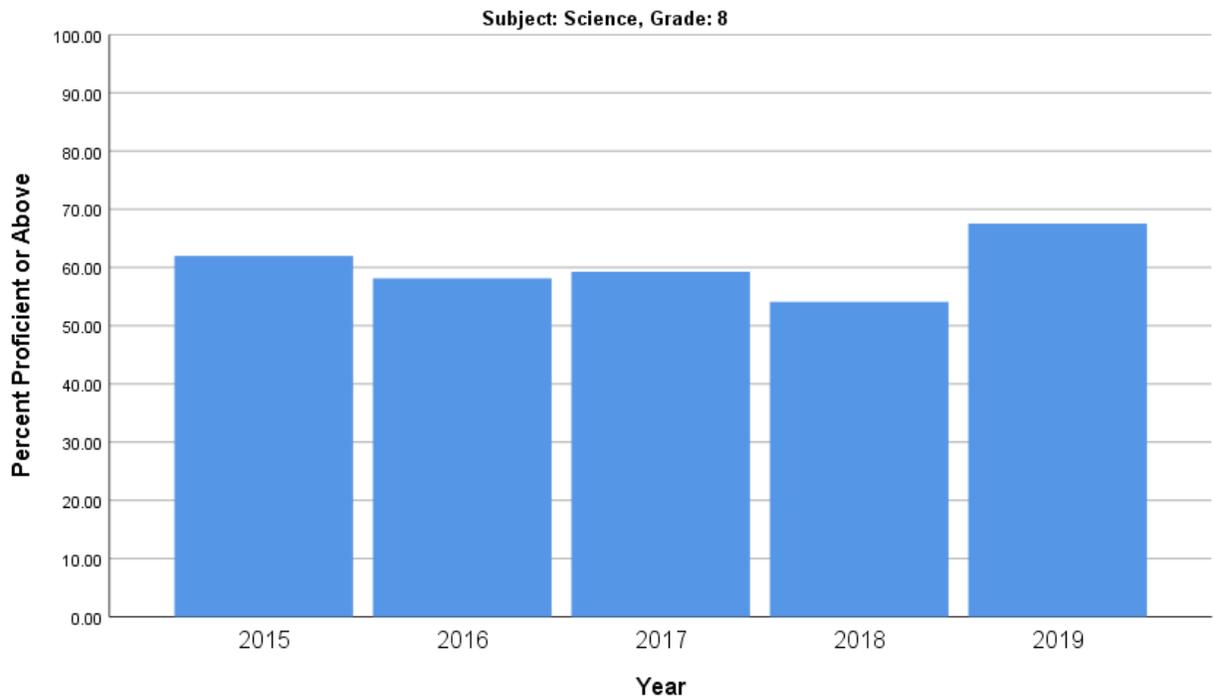
Subject: Math, Grade: 3





Subject: Math, Grade: 7





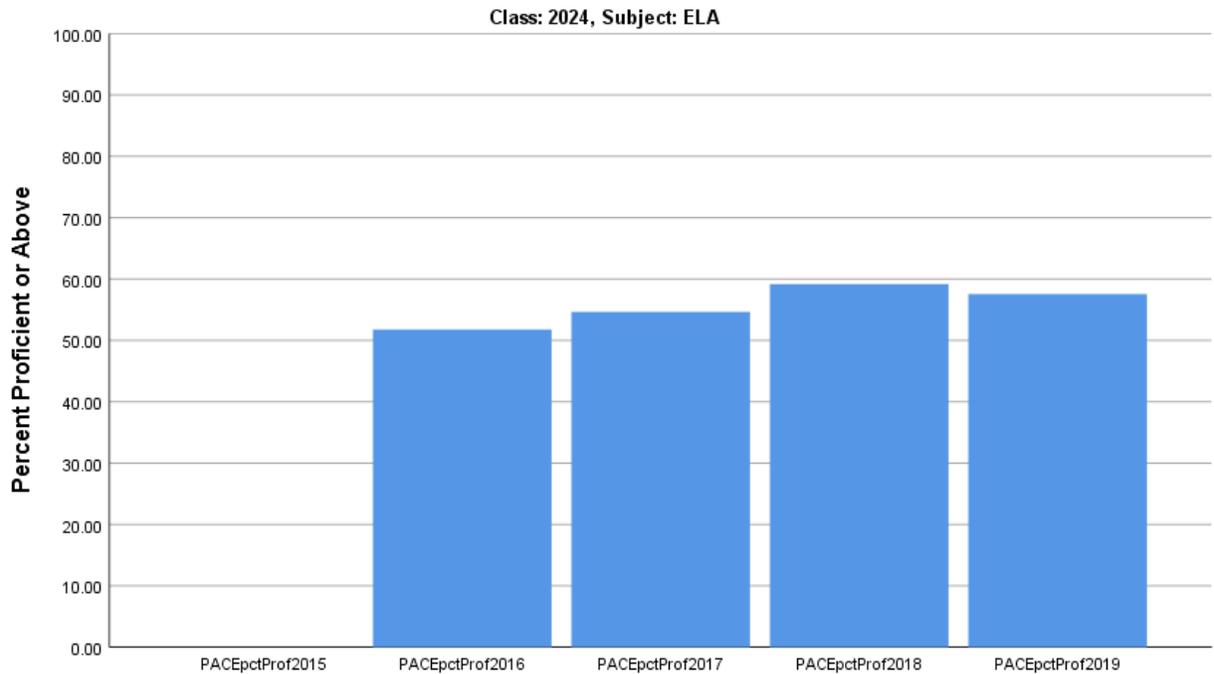
Results for the cohort analysis for PACE suggest that the percent of students deemed proficient or above is relatively stable across years in a given subject/grade combination, especially as the composition of districts in each year varies. The district-specific results in Appendix D show some district, grade, and subject combinations where proficiency rates are higher and others where proficiency rates are lower in 2018-19 within and across districts (in comparison to prior years' results). This suggests that there is no systematic under- or over-estimation of achievement based on the cut score calculations in the 2018-19 school year.

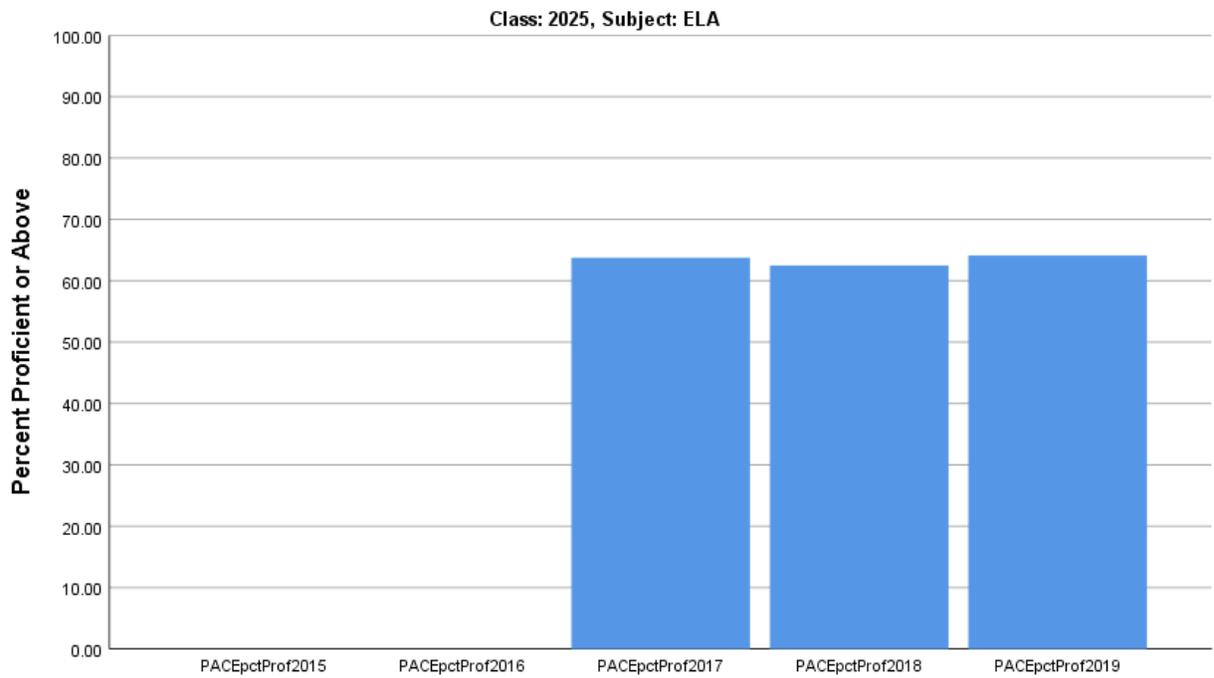
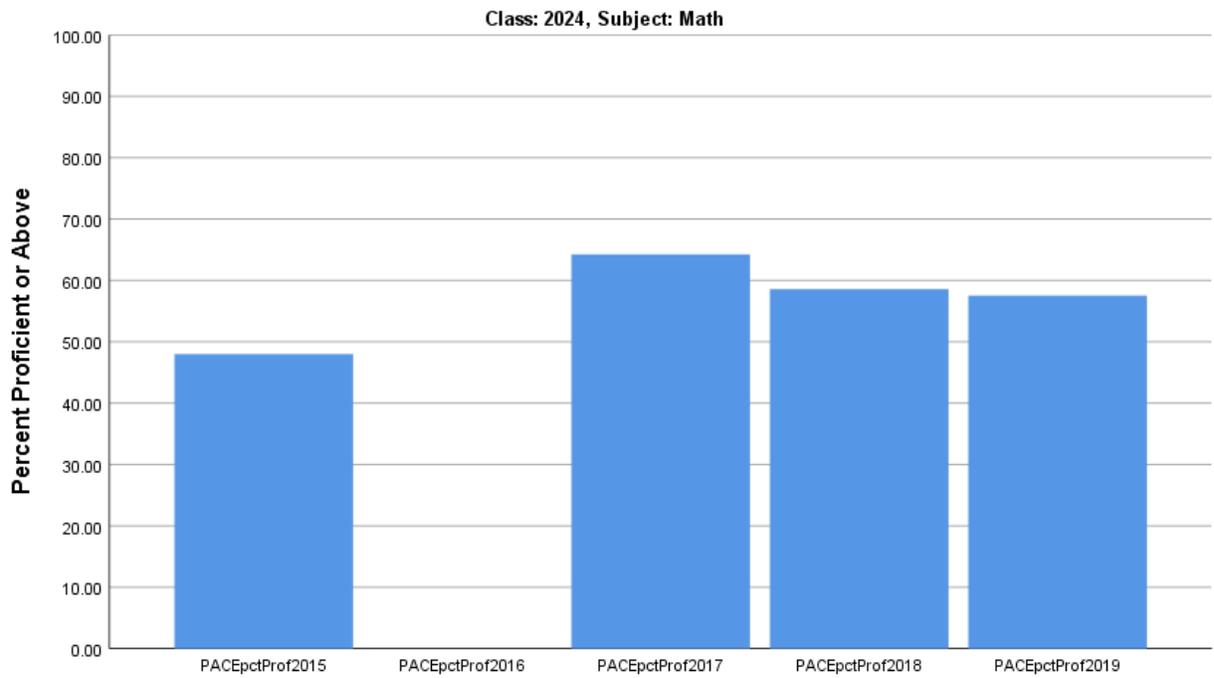
Longitudinal Analysis

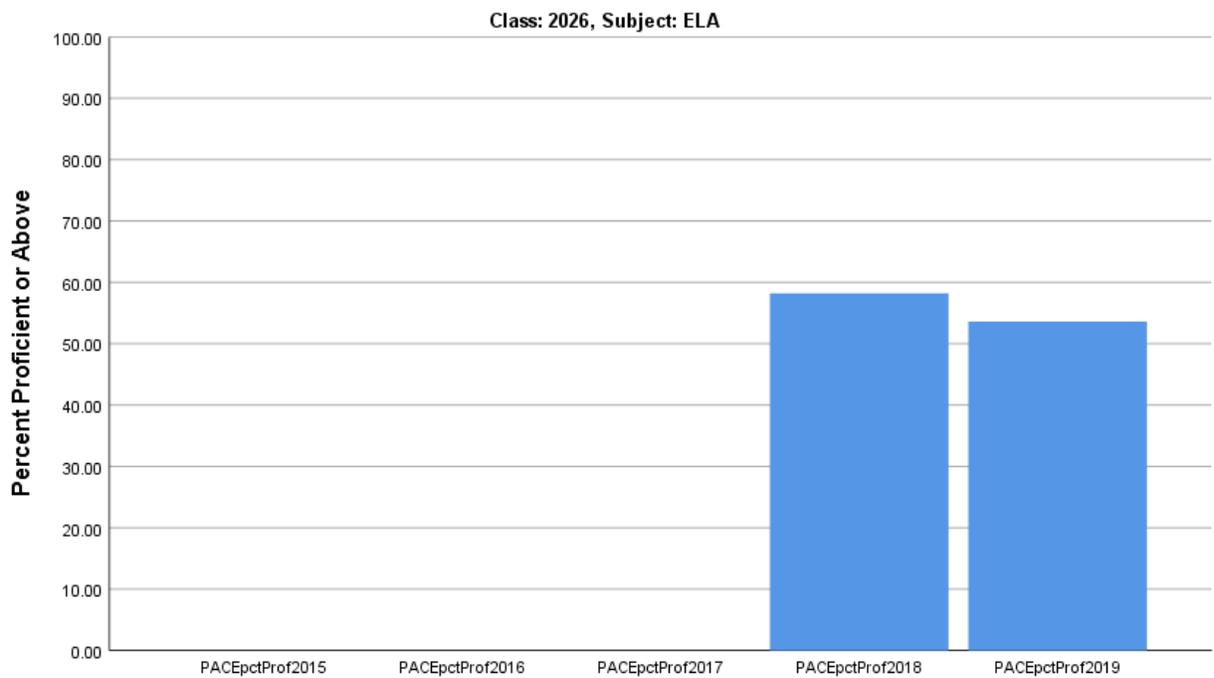
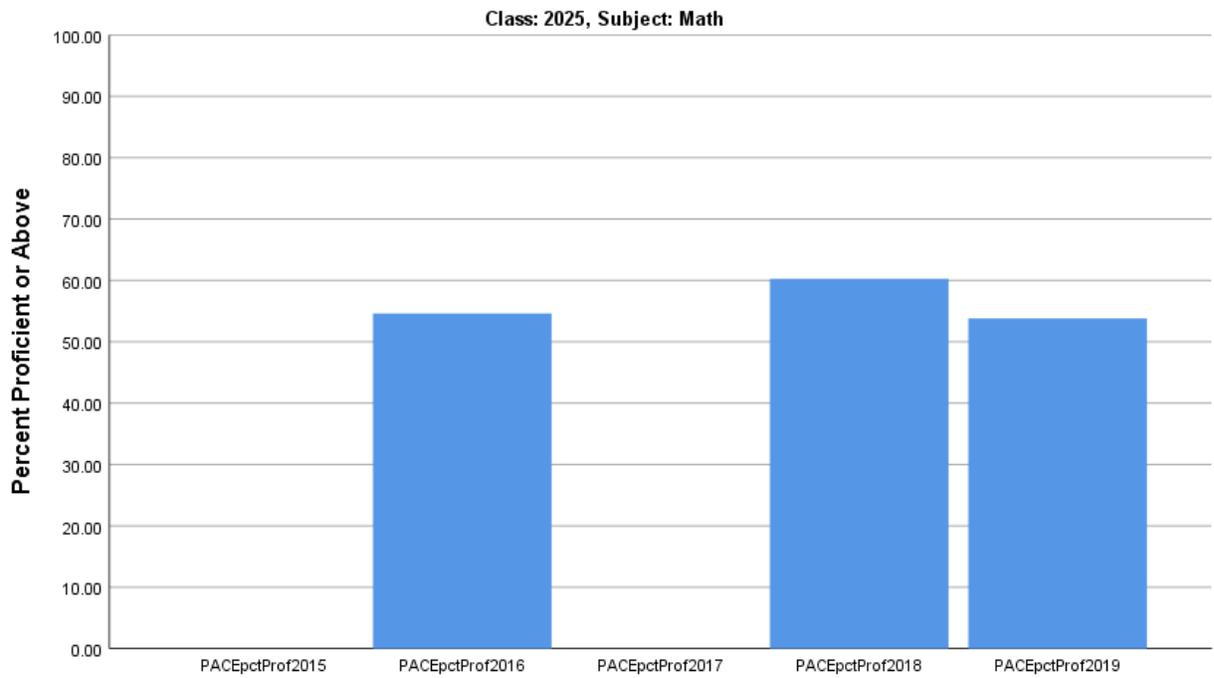
The longitudinal analysis compares the percent of students deemed proficient or above in the PACE system by graduation class and subject area from 2015 to 2019. These are the same groups of students over time; whereas the cohort analysis is the same grade/subject over time but different groups of students. As with the cohort analysis, each year has a different composition of districts due to the way PACE scales over time. The first bar graph below shows the Class of 2024 for ELA. The bars show proficiency rates for this group of students from when they were in grade 4 PACE ELA in the 2015-16 school year to grade 7 NH SAS ELA in 2018-19 school year. Proficiency rates shown are all based on PACE results.

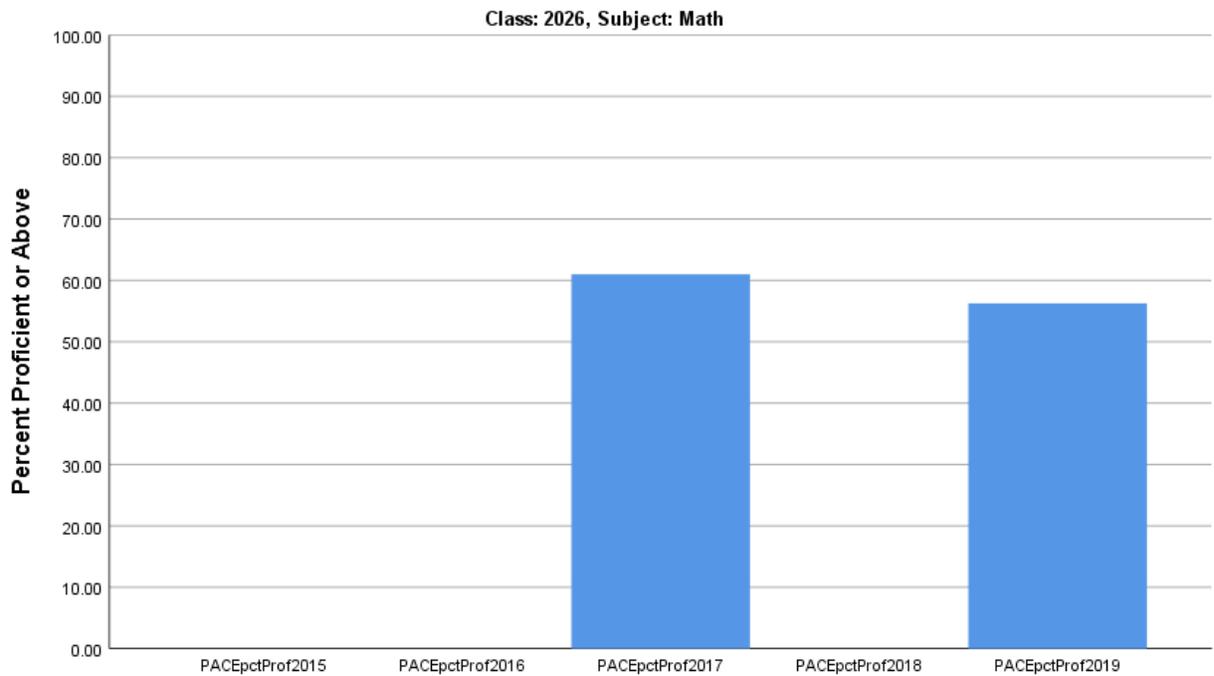
Results are only included if the graduation class has at least 2019 and one other year of data available for a given subject area. The included graduation classes are as follows:

- Class of 2024=Grade 7 in 2019
- Class of 2025=Grade 6 in 2019
- Class of 2026=Grade 5 in 2019





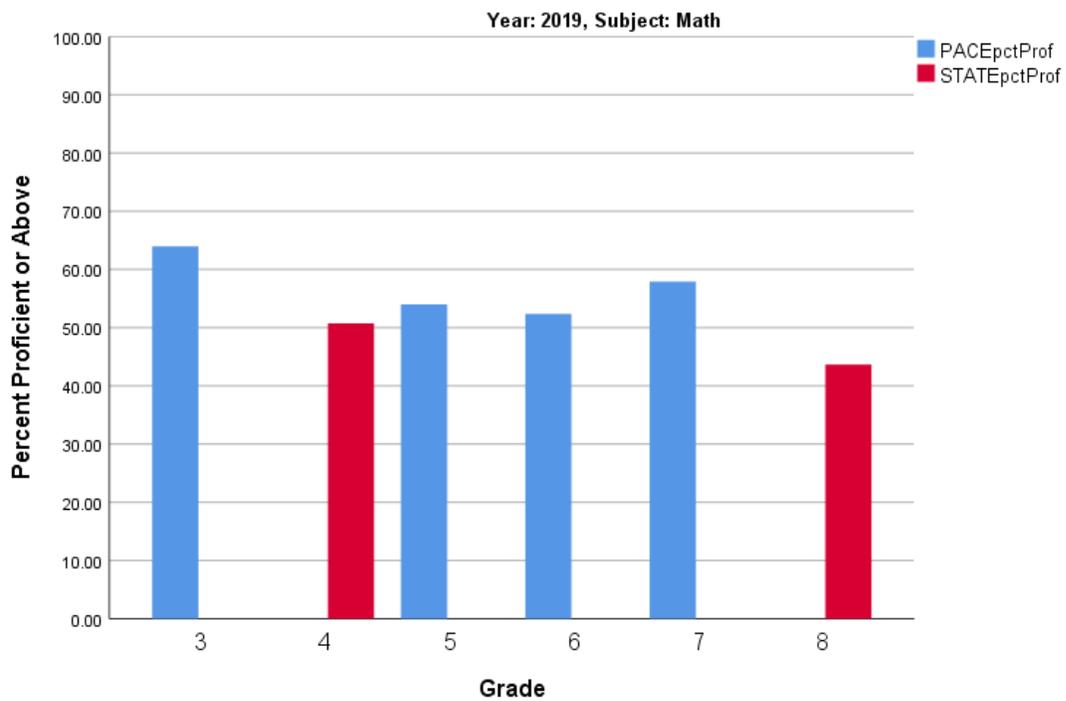
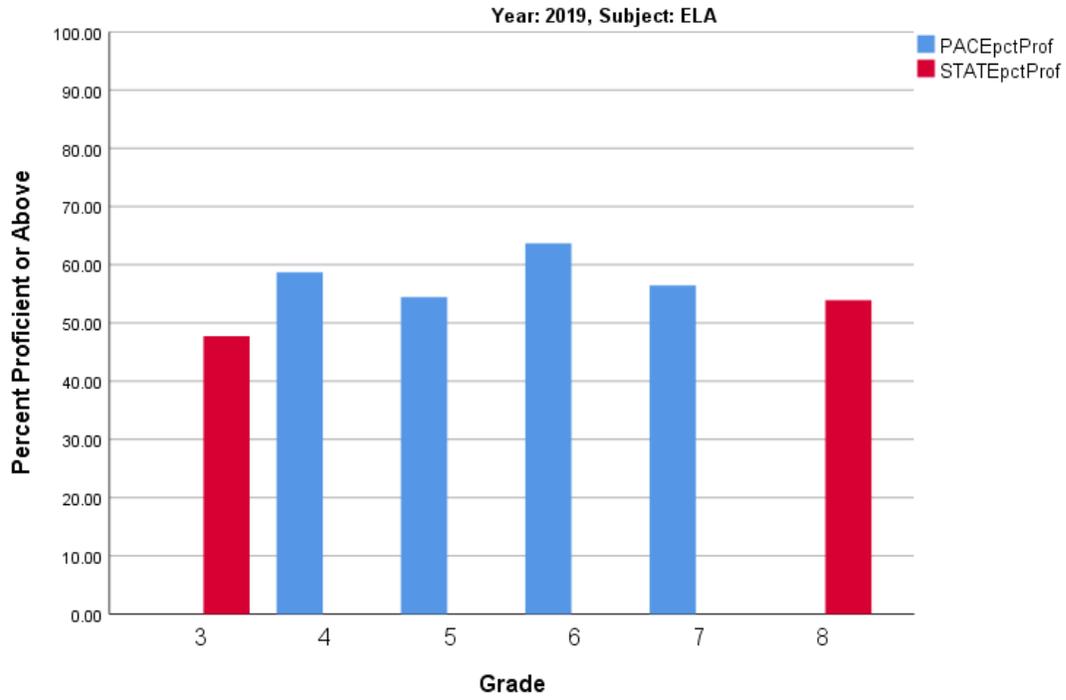


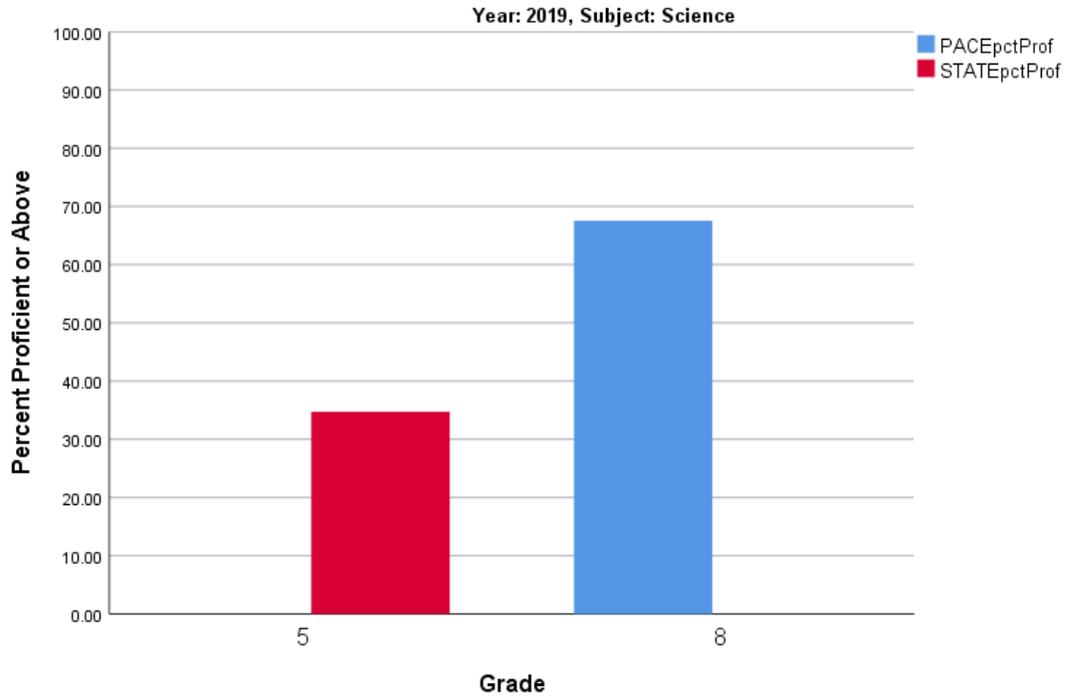


Results for the longitudinal analysis are consistent with the cohort analysis and suggest that PACE results are consistent and stable over time when comparing the same group of students by subject from 2015 to 2019. District-specific analyses in Appendix D are also similar to the cohort analyses in that there does not appear to be any systematic over- or under-estimation of achievement using the PACE standards in 2018-19.

State Test Analysis

The state test analysis compares the percent of students deemed proficient or above in grades 3-8 for 2019 by subject for all the PACE districts.



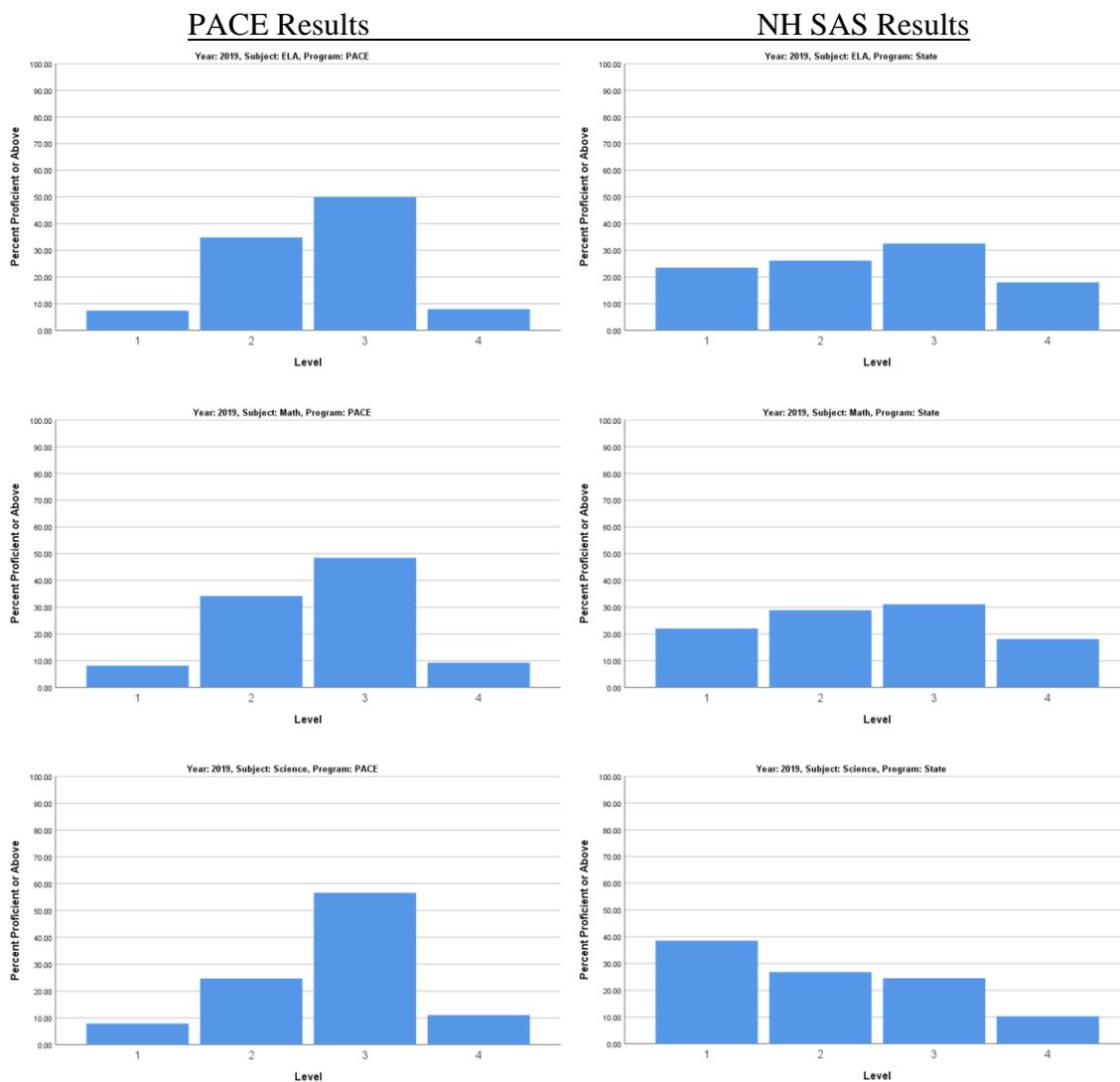


Results for the state test analysis show that PACE proficiency rates tend to be fairly consistent with NH SAS proficiency rates when comparing rates across grades. If it were not for the bar colors it would be difficult to differentiate which results were PACE and which results were NH SAS.

Performance Level Analysis

We also examined the percent of students classified into each performance level for PACE grades/subjects (i.e., grade 4-7 ELA, grade 3/5-7 Math, grade 8 science) and NH SAS grades/subjects (i.e., grade 3 ELA, grade 4 Math, grade 5 science, and grade 8 ELA/Math) in 2019 using data on PACE districts. The purpose of this analyses is to examine the distribution of performance across the four achievement levels and how the PACE distribution of achievement levels compares to the NH SAS distribution of achievement levels. We expect the NH SAS by design to have a more even distribution of performance across the four achievement levels.

The PACE performance level results are on the left-hand panels and the NH SAS performance level results are on the right-hand panels for ELA, Math, and Science respectively.



Overall, results of the performance level analysis suggest that there is a normal distribution of performance across the four PACE achievement levels with fewer students deemed Level 1 and Level 4, in general. As expected, the NH SAS distribution is more even across performance

levels though the grade 5 science distribution is slightly skewed such that there is more students deemed Level 1 and 2.

Final 2018-19 PACE Cut Scores

Final 2019 PACE cut scores were sent to the NH DOE on August 15, 2019 along with instructions on how to apply the cut scores to calculate PACE annual determinations. That documentation is provided following the cut scores in this report. The cuts are highlighted in yellow.

Scale.ID	Min.AL1	Max.AL1	Min.AL2	Max.AL2	Min.AL3	Max.AL3	Min.AL4	Max.AL4
2019 Amherst PACE Grade 5 ELA	1.00	2.09	2.10	2.72	2.73	3.20	3.21	4.00
2019 Amherst PACE Grade 5 Math	1.00	2.13	2.14	2.70	2.71	3.19	3.20	4.00
2019 Amherst PACE Grade 6 ELA	1.00	1.80	1.81	2.49	2.50	3.61	3.62	4.00
2019 Amherst PACE Grade 6 Math	1.00	1.60	1.61	2.61	2.62	3.29	3.30	4.00
2019 Amherst PACE Grade 7 ELA	1.00	1.55	1.56	2.65	2.66	3.28	3.29	4.00
2019 Amherst PACE Grade 7 Math	1.00	2.01	2.02	2.58	2.59	3.15	3.16	4.00
2019 Amherst PACE Grade 8 Sci	1.00	1.87	1.88	2.66	2.67	3.57	3.58	4.00
2019 Concord PACE Grade 3 Math	1.00	1.90	1.91	2.67	2.68	3.46	3.47	4.00
2019 Concord PACE Grade 4 ELA	1.00	1.88	1.89	2.71	2.72	3.93	3.94	4.00
2019 Concord PACE Grade 5 ELA	1.00	1.78	1.79	2.66	2.67	3.54	3.55	4.00
2019 Concord PACE Grade 5 Math	1.00	1.84	1.85	2.67	2.68	3.41	3.42	4.00
2019 Concord PACE Grade 6 ELA	1.00	1.52	1.53	2.65	2.66	3.61	3.62	4.00
2019 Concord PACE Grade 6 Math	1.00	1.90	1.91	2.86	2.87	3.65	3.66	4.00
2019 Concord PACE Grade 7 ELA	1.00	1.74	1.75	2.89	2.90	3.85	3.86	4.00
2019 Concord PACE Grade 7 Math	1.00	1.87	1.88	3.10	3.11	3.91	3.92	4.00
2019 Concord PACE Grade 8 Sci	1.00	1.68	1.69	2.57	2.58	3.65	3.66	4.00
2019 Conway PACE Grade 3 Math	1.00	1.69	1.70	2.39	2.40	3.19	3.20	4.00
2019 Conway PACE Grade 4 ELA	1.00	1.74	1.75	2.49	2.50	3.99	4.00	4.00
2019 Conway PACE Grade 5 ELA	1.00	2.08	2.09	2.87	2.88	3.61	3.62	4.00
2019 Conway PACE Grade 5 Math	1.00	1.67	1.68	2.79	2.80	3.75	3.76	4.00
2019 Conway PACE Grade 6 ELA	1.00	1.88	1.89	2.66	2.67	3.99	4.00	4.00
2019 Conway PACE Grade 6 Math	1.00	2.10	2.11	2.88	2.89	3.43	3.44	4.00
2019 Epping PACE Grade 3 Math	1.00	1.76	1.77	2.53	2.54	3.99	4.00	4.00
2019 Epping PACE Grade 4 ELA	1.00	1.52	1.53	2.62	2.63	3.52	3.53	4.00

2019 Epping PACE Grade 5 ELA	1.00	1.72	1.73	2.79	2.80	3.39	3.40	4.00
2019 Epping PACE Grade 5 Math	1.00	1.80	1.81	2.71	2.72	3.41	3.42	4.00
2019 Epping PACE Grade 6 ELA	1.00	1.41	1.42	2.71	2.72	3.99	4.00	4.00
2019 Epping PACE Grade 6 Math	1.00	1.70	1.71	2.59	2.60	3.35	3.36	4.00
2019 Epping PACE Grade 7 ELA	1.00	1.49	1.50	2.67	2.68	3.62	3.63	4.00
2019 Epping PACE Grade 7 Math	1.00	1.61	1.62	2.78	2.79	3.52	3.53	4.00
2019 Epping PACE Grade 8 Sci	1.00	2.31	2.32	2.87	2.88	3.62	3.63	4.00
2019 Haverhill Cooperative PACE Grade 3 Math	1.00	1.74	1.75	2.71	2.72	3.61	3.62	4.00
2019 Haverhill Cooperative PACE Grade 4 ELA	1.00	1.68	1.69	2.43	2.44	3.10	3.11	4.00
2019 Haverhill Cooperative PACE Grade 5 ELA	1.00	1.97	1.98	2.42	2.43	3.27	3.28	4.00
2019 Haverhill Cooperative PACE Grade 5 Math	1.00	1.68	1.69	2.64	2.65	3.99	4.00	4.00
2019 Haverhill Cooperative PACE Grade 6 ELA	1.00	1.60	1.61	2.53	2.54	3.67	3.68	4.00
2019 Haverhill Cooperative PACE Grade 6 Math	1.00	1.29	1.30	2.52	2.53	3.90	3.91	4.00
2019 Haverhill Cooperative PACE Grade 7 ELA	1.00	1.85	1.86	2.70	2.71	3.61	3.62	4.00
2019 Haverhill Cooperative PACE Grade 7 Math	1.00	1.37	1.38	2.68	2.69	3.99	4.00	4.00
2019 Haverhill Cooperative PACE Grade 8 Science	1.00	1.36	1.37	2.43	2.44	3.47	3.48	4.00
2019 Laconia PACE Grade 3 Math	1.00	1.58	1.59	2.61	2.62	3.40	3.41	4.00
2019 Laconia PACE Grade 4 ELA	1.00	1.63	1.64	2.57	2.58	3.28	3.29	4.00
2019 Laconia PACE Grade 5 ELA	1.00	1.42	1.43	2.48	2.49	3.99	4.00	4.00
2019 Laconia PACE Grade 5 Math	1.00	1.55	1.56	2.47	2.48	3.53	3.54	4.00
2019 Monroe PACE Grade 3 Math	1.00	1.94	1.95	2.89	2.90	2.99	3.00	4.00
2019 Monroe PACE Grade 4 ELA	1.00	1.74	1.75	2.49	2.50	3.99	4.00	4.00
2019 Monroe PACE Grade 5 ELA	1.00	1.99	2.00	2.99	3.00	3.49	3.50	4.00
2019 Monroe PACE Grade 5 Math	1.00	1.74	1.75	2.48	2.49	3.24	3.25	4.00
2019 Monroe PACE Grade 6 ELA	1.00	1.74	1.75	2.48	2.49	3.50	3.51	4.00

2019 Monroe PACE Grade 6 Math	1.00	1.82	1.83	2.66	2.67	3.49	3.50	4.00
2019 Monroe PACE Grade 7 ELA	1.00	2.73	2.74	2.98	2.99	3.03	3.04	4.00
2019 Monroe PACE Grade 7 Math	1.00	1.50	1.51	2.97	2.98	3.50	3.51	4.00
2019 Monroe PACE Grade 8 Sci	1.00	2.48	2.49	2.96	2.97	3.48	3.49	4.00
2019 Newport PACE Grade 3 Math	1.00	1.33	1.34	2.23	2.24	3.99	4.00	4.00
2019 Newport PACE Grade 4 ELA	1.00	1.82	1.83	2.60	2.61	3.99	4.00	4.00
2019 Newport PACE Grade 5 ELA	1.00	1.87	1.88	2.73	2.74	3.54	3.55	4.00
2019 Newport PACE Grade 5 Math	1.00	1.72	1.73	3.07	3.08	3.79	3.80	4.00
2019 Newport PACE Grade 6 ELA	1.00	2.06	2.07	2.89	2.90	3.49	3.50	4.00
2019 Newport PACE Grade 6 Math	1.00	2.69	2.70	3.47	3.48	3.99	4.00	4.00
2019 Newport PACE Grade 7 ELA	1.00	1.12	1.13	2.31	2.32	3.99	4.00	4.00
2019 Newport PACE Grade 7 Math	1.00	1.33	1.34	2.38	2.39	3.99	4.00	4.00
2019 Newport PACE Grade 8 Sci	1.00	1.48	1.49	2.42	2.43	3.41	3.42	4.00
2019 Rochester PACE Grade 3Math	1.00	2.13	2.14	2.81	2.82	3.64	3.65	4.00
2019 Rochester PACE Grade 4 ELA	1.00	2.34	2.35	3.09	3.10	3.85	3.86	4.00
2019 Rochester PACE Grade 5 ELA	1.00	2.30	2.31	3.15	3.16	3.84	3.85	4.00
2019 Rochester PACE Grade 5Math	1.00	2.33	2.34	3.07	3.08	3.88	3.89	4.00
2019 Rochester PACE Grade 6 ELA	1.00	2.28	2.29	3.55	3.56	3.99	4.00	4.00
2019 Rochester PACE Grade 6Math	1.00	2.66	2.67	3.47	3.48	3.99	4.00	4.00
2019 Rochester PACE Grade 7 ELA	1.00	2.75	2.76	3.59	3.60	3.99	4.00	4.00
2019 Rochester PACE Grade 7Math	1.00	2.30	2.31	3.40	3.41	3.99	4.00	4.00
2019 Rochester PACE Grade 8 Science	1.00	1.46	1.47	2.97	2.98	3.97	3.98	4.00
2019 Sanborn Regional PACE Grade 3 Math	0.00	1.39	1.40	2.78	2.79	3.43	3.44	4.00
2019 Sanborn Regional PACE Grade 4 ELA	0.00	2.39	2.40	2.82	2.83	3.18	3.19	4.00
2019 Sanborn Regional PACE Grade 5 ELA	0.00	1.75	1.76	2.74	2.75	3.66	3.67	4.00
2019 Sanborn Regional PACE Grade 5 Math	0.00	1.61	1.62	2.70	2.71	3.17	3.18	4.00
2019 Sanborn Regional PACE Grade 6 ELA	0.00	1.98	1.99	2.54	2.55	3.36	3.37	4.00

2019 Sanborn Regional PACE Grade 6 Math	0.00	1.93	1.94	2.78	2.79	3.40	3.41	4.00
2019 Sanborn Regional PACE Grade 7 ELA	0.00	1.86	1.87	2.63	2.64	3.22	3.23	4.00
2019 Sanborn Regional PACE Grade 7 Math	0.00	2.11	2.12	2.84	2.85	3.71	3.72	4.00
2019 Sanborn Regional PACE Grade 8 Science	0.00	1.53	1.54	2.54	2.55	3.43	3.44	4.00
2019 SAU #35 Office PACE Grade 3 Math	1.00	1.91	1.92	2.83	2.84	3.73	3.74	4.00
2019 SAU #35 Office PACE Grade 4 ELA	1.00	1.79	1.80	2.59	2.60	3.48	3.49	4.00
2019 SAU #35 Office PACE Grade 5 ELA	1.00	1.90	1.91	2.81	2.82	3.99	4.00	4.00
2019 SAU #35 Office PACE Grade 5 Math	1.00	1.74	1.75	2.49	2.50	3.99	4.00	4.00
2019 SAU #35 Office PACE Grade 6 ELA	1.00	1.79	1.80	2.59	2.60	3.99	4.00	4.00
2019 SAU #35 Office PACE Grade 6 Math	1.00	1.74	1.75	2.49	2.50	3.99	4.00	4.00
2019 Seacoast Charter School PACE Grade 3 Math	1.00	1.52	1.53	2.54	2.55	3.21	3.22	4.00
2019 Seacoast Charter School PACE Grade 4 ELA	1.00	1.68	1.69	2.78	2.79	3.99	4.00	4.00
2019 Seacoast Charter School PACE Grade 5 ELA	1.00	1.58	1.59	2.86	2.87	3.42	3.43	4.00
2019 Seacoast Charter School PACE Grade 5 Math	1.00	1.99	2.00	2.99	3.00	3.99	4.00	4.00
2019 Seacoast Charter School PACE Grade 6 ELA	1.00	2.06	2.07	2.77	2.78	3.99	4.00	4.00
2019 Seacoast Charter School PACE Grade 6 Math	1.00	1.88	1.89	2.64	2.65	3.19	3.20	4.00
2019 Seacoast Charter School PACE Grade 7 ELA	1.00	1.50	1.51	2.01	2.02	3.00	3.01	4.00
2019 Seacoast Charter School PACE Grade 7 Math	1.00	1.73	1.74	2.47	2.48	3.49	3.50	4.00
2019 Seacoast Charter School PACE Grade 8 Sci	1.00	1.82	1.83	2.66	2.67	3.03	3.04	4.00

Instructions to NH DOE on Calculating NH PACE Reported Annual Determinations

1. Clean the data

- a. It should be first checked that there is at least one end of year competency score submitted for each student in all PACE grades and subject areas as determined by Table 1 below.

Table 1. PACE Administration Chart 2019

	ELA	Math	Science
Grade 3		PACE	
Grade 4	PACE		
Grade 5	PACE	PACE	
Grade 6	PACE	PACE	
Grade 7	PACE	PACE	
Grade 8			PACE

- b. Secondly, ensure that all scores to be included in the score calculation fall within the intended range. If any scores submitted for any student fall outside the range (e.g., 0.75 on a 1.00-4.00 scale, 102 on a 100-point scale) they should be reconciled (e.g., follow up with the district or school to correct the data entry or scoring error).
- c. Students with no competency scores are considered non-participants.

2. Calculate mean scores by subject area

- a. All submitted competency scores for each student in each subject area need to be averaged³. The resulting student-by-subject averages are henceforth referred to as the student average end of year competency scores.
- b. Round the average end of year competency scores to two decimal places.

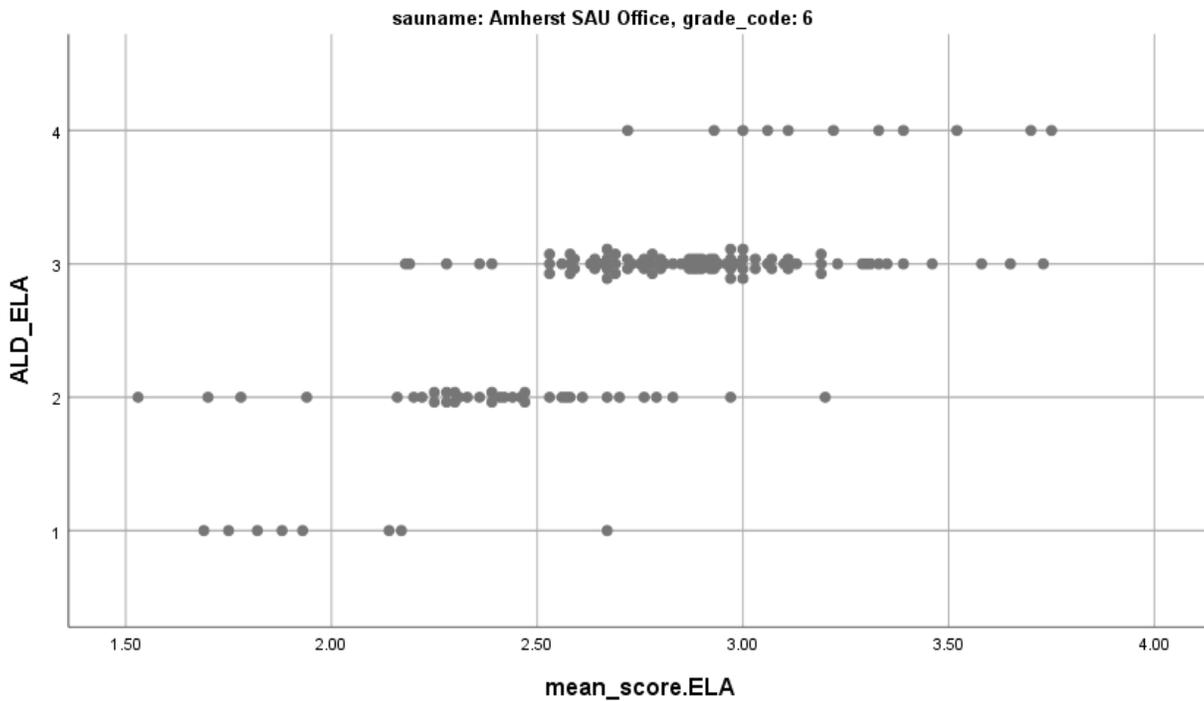
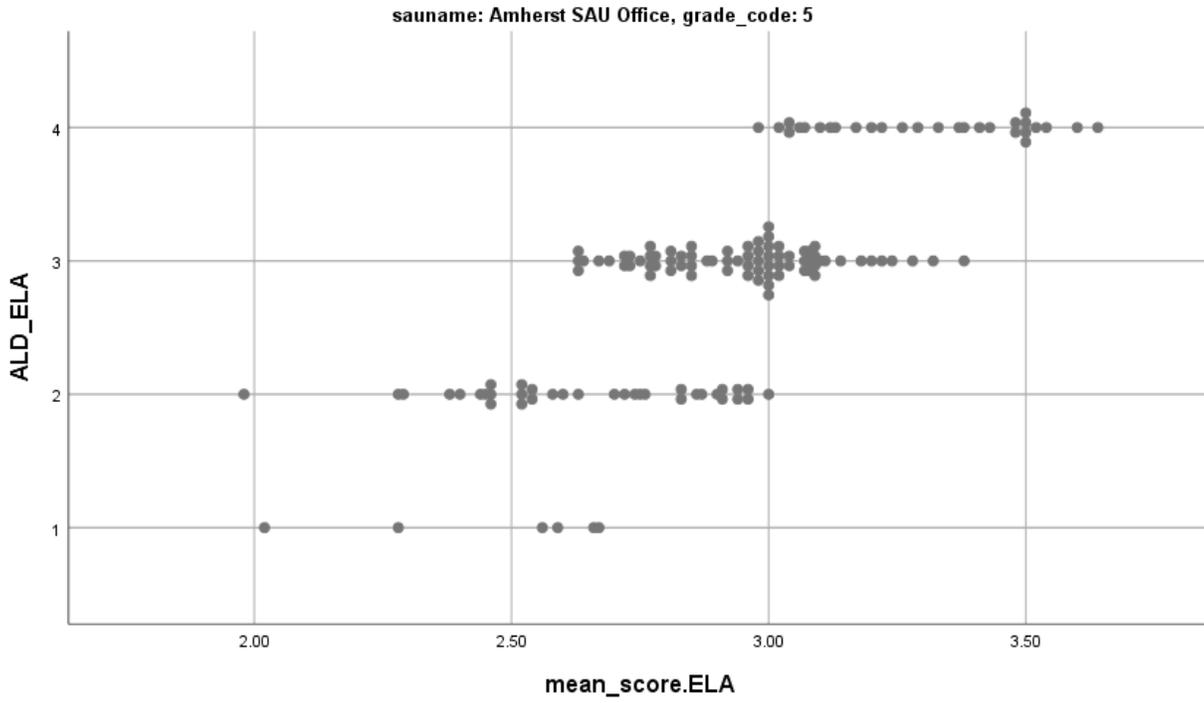
3. Determine the reportable achievement level of each student

- a. The average competency scores that result from step 2 need to be classified into achievement levels using the provided cut scores.
- b. Though the occurrence is rare, some average competency scores will fall outside the expected score range, even with follow-up reconciliation with districts. This is most commonly due to the awarding of zero's for achievement that is so low that the student work consistently does not meet the expectations for scoring a level 1 on a 4-point rubric. Alternatively, in some courses and districts, the practice of awarding extra credit makes it possible for some students to score above the expected score range. Students falling below the expected score range (e.g., .75 on a 1.00-4.00 scale) should be awarded the lowest possible achievement level—Level 1. Students scoring above the expected range should be awarded the highest possible achievement level—Level 4.

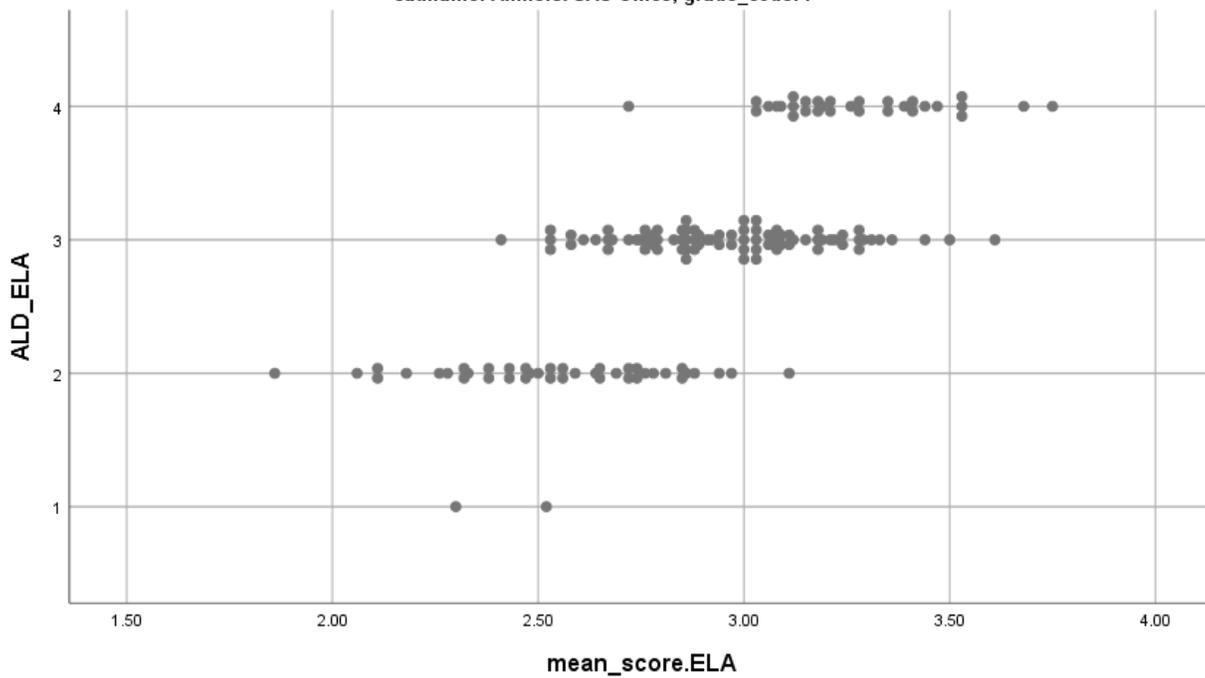
³ Blank and zero competency scores are not included in the average.

Appendix A: Scatterplots of End of year competency scores by teacher judgment survey ratings & Descriptive statistics

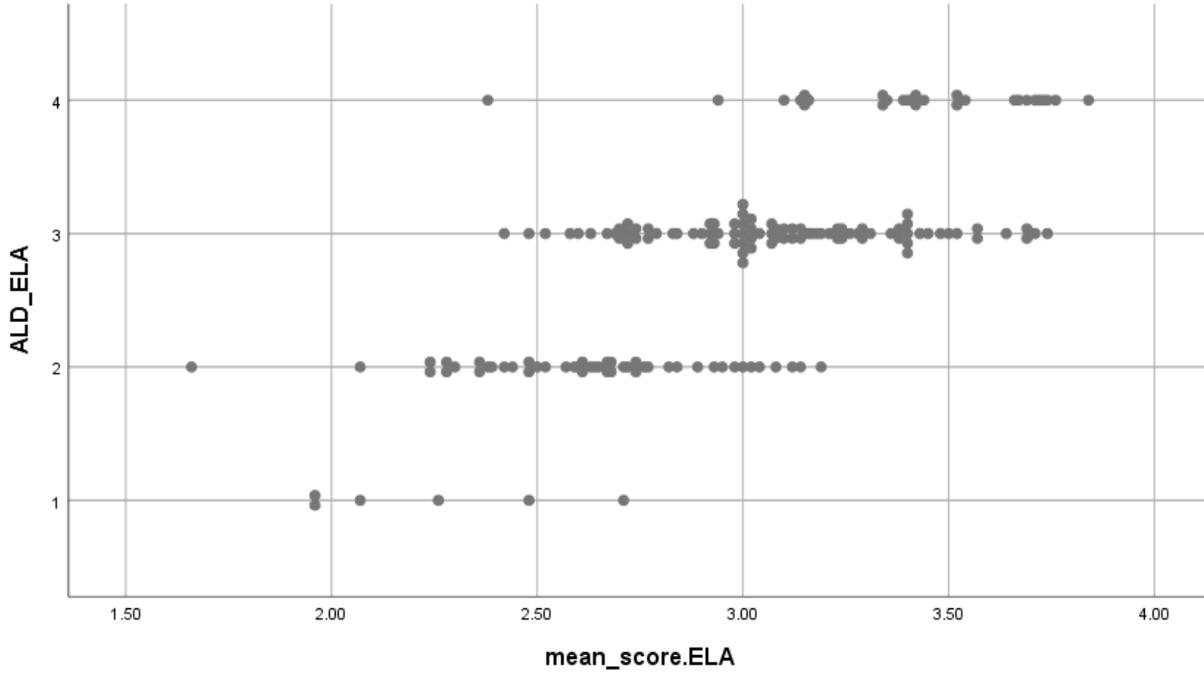
ELA Scatterplots



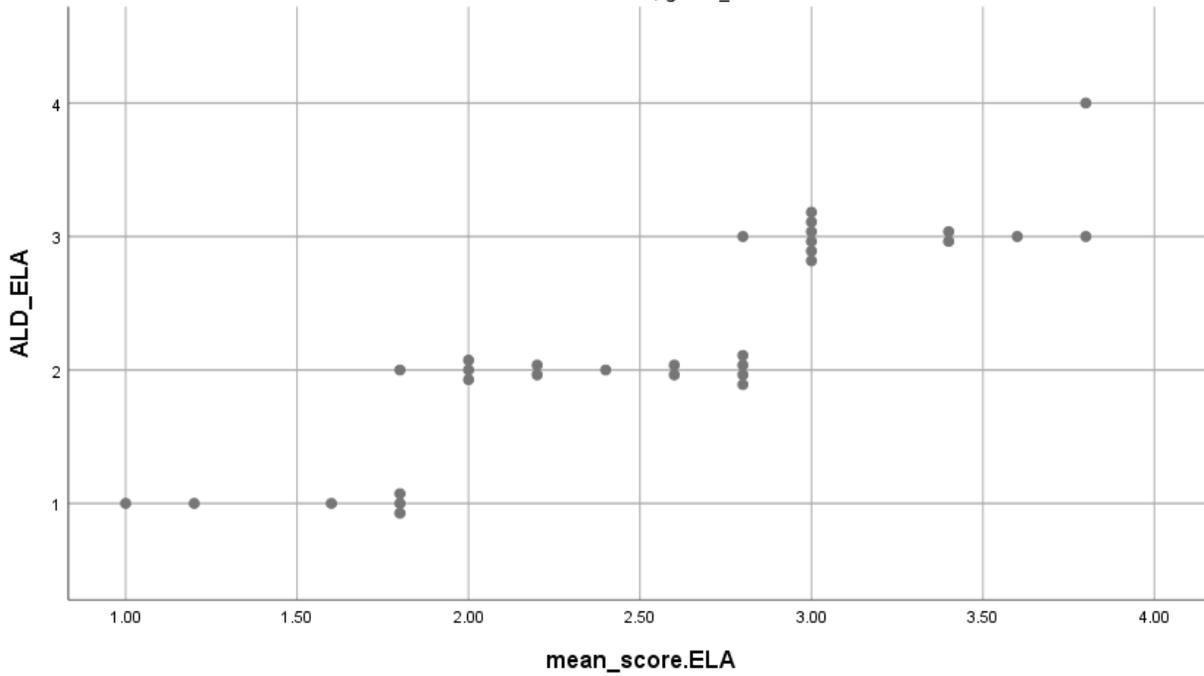
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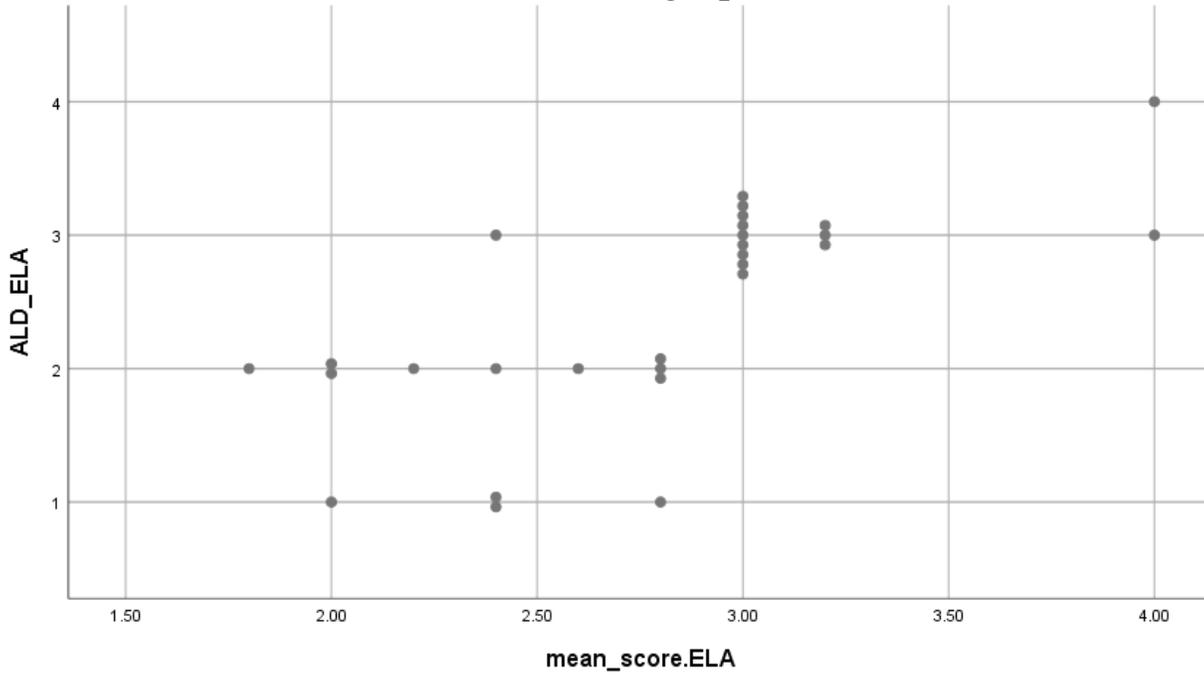
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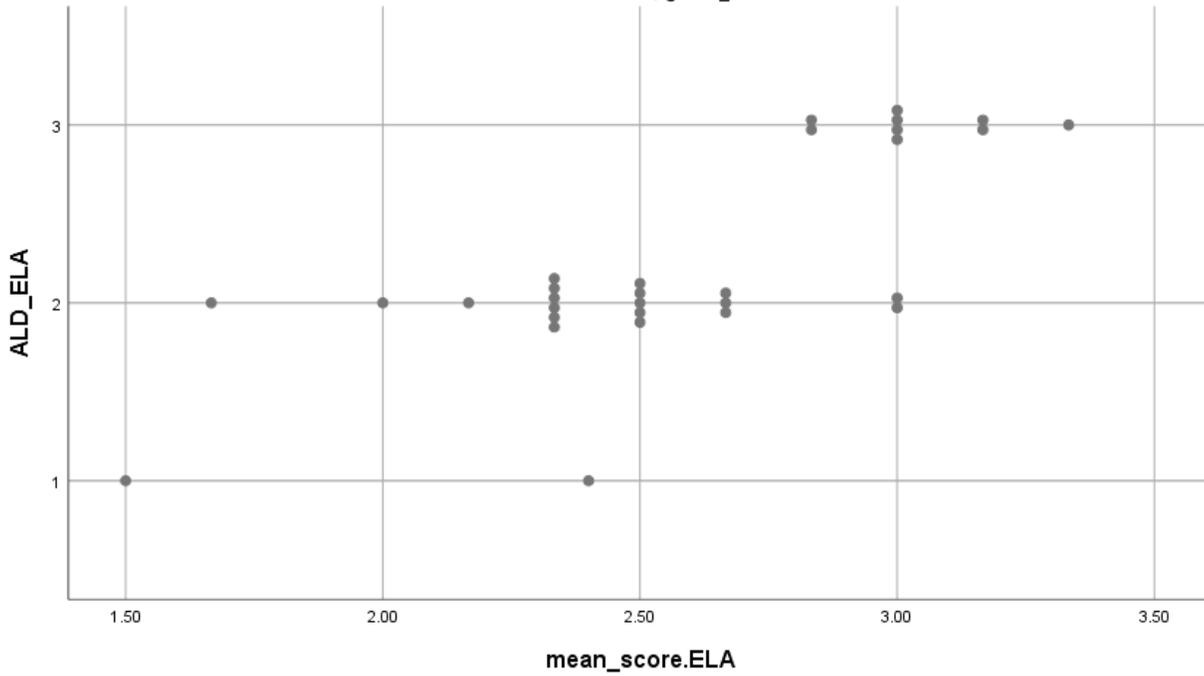
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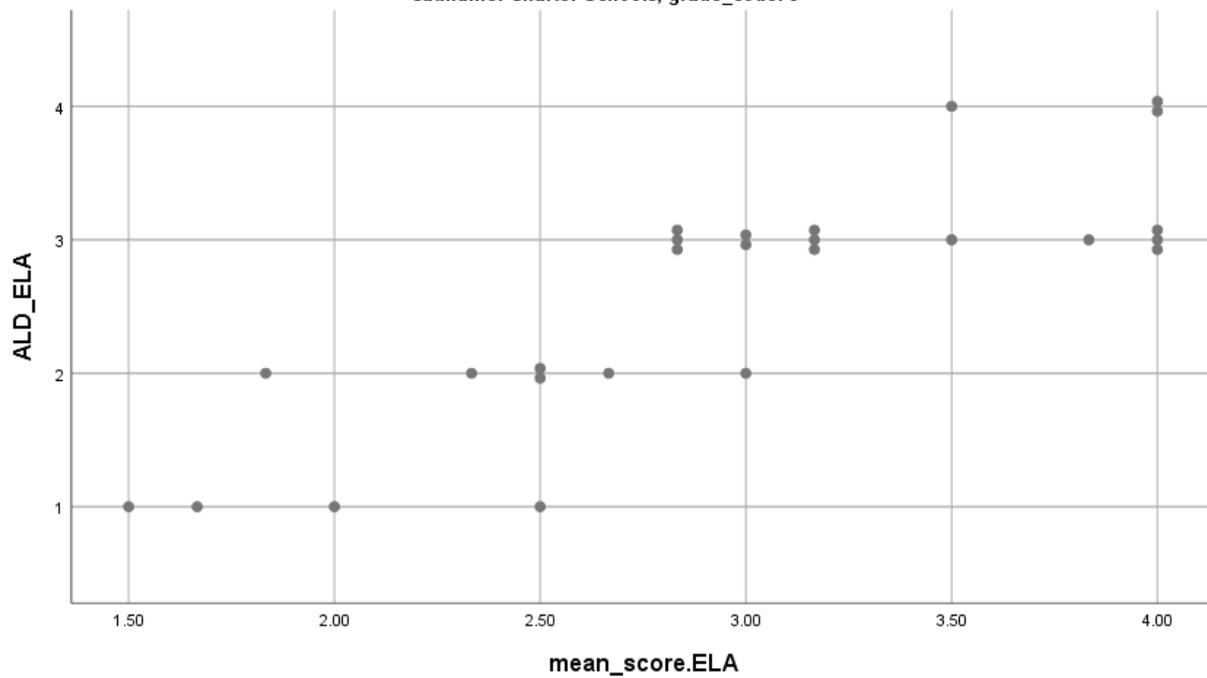
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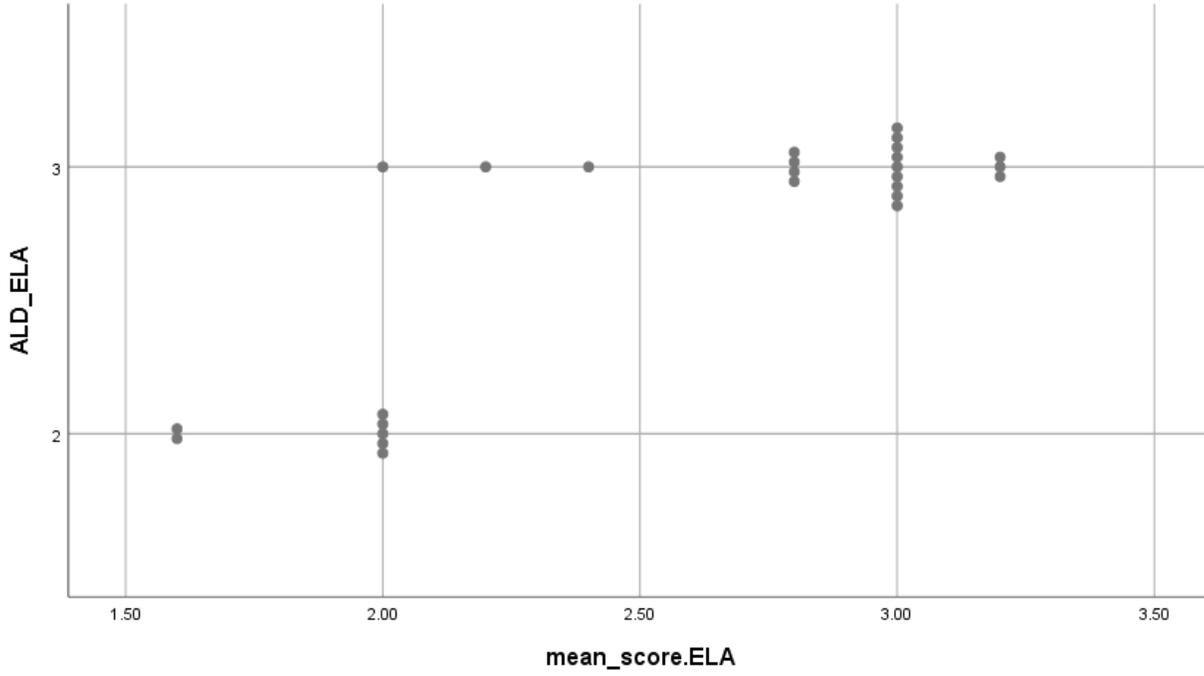
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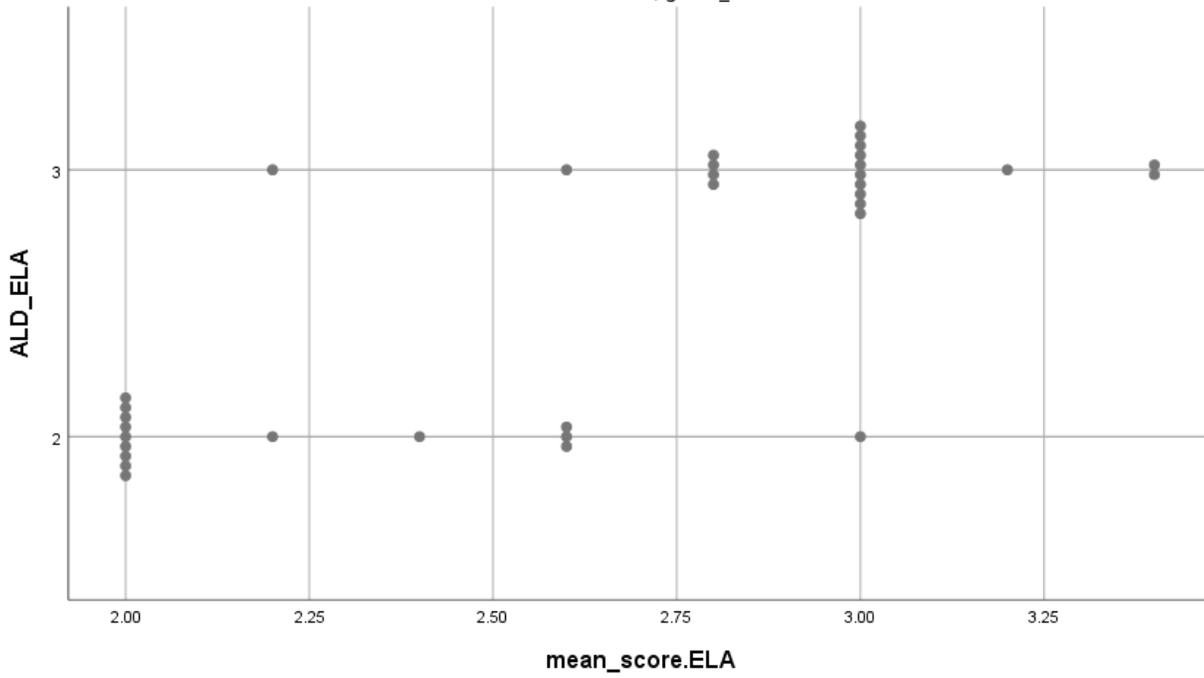
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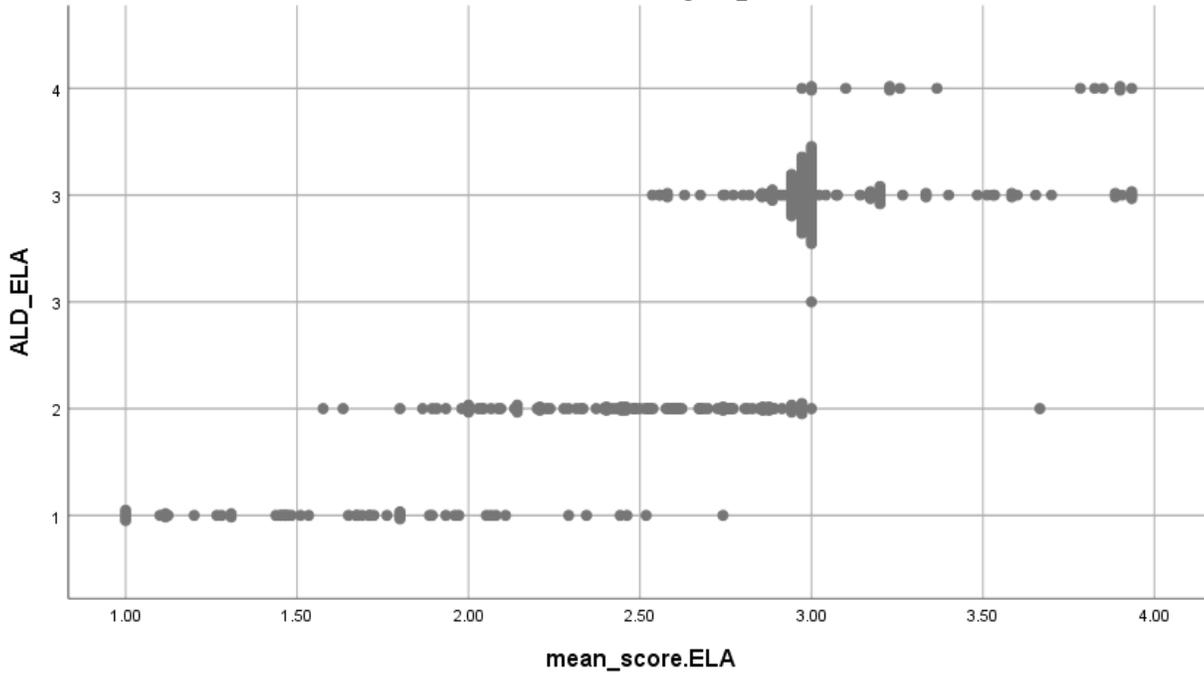
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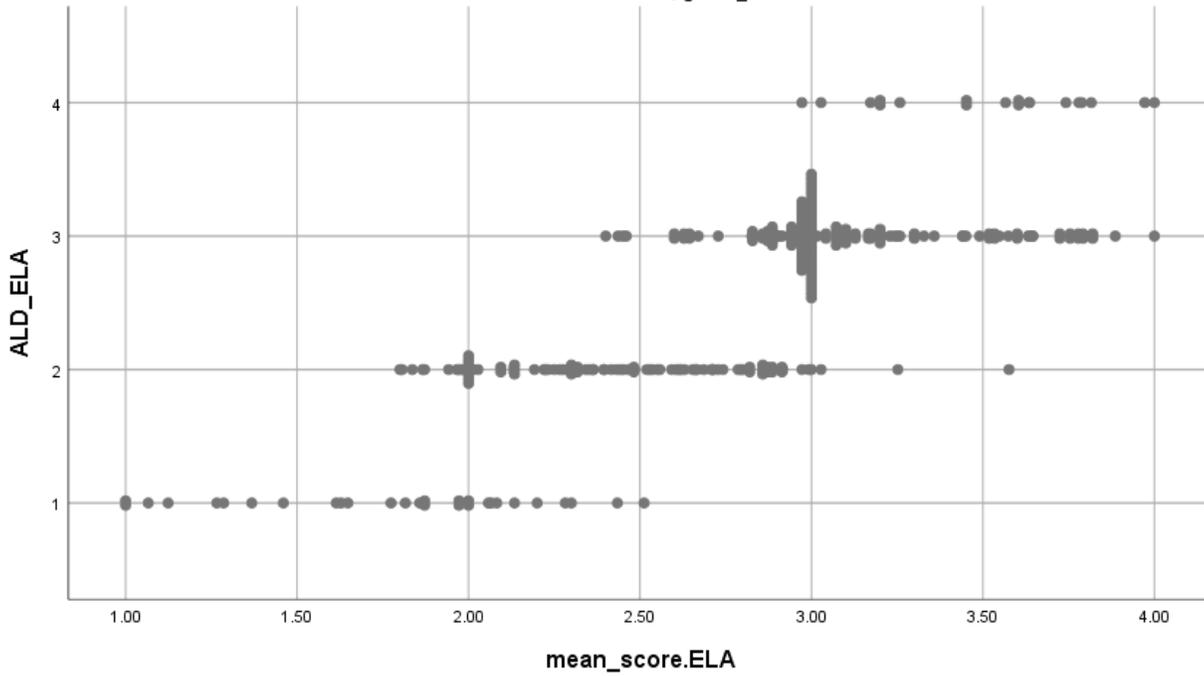
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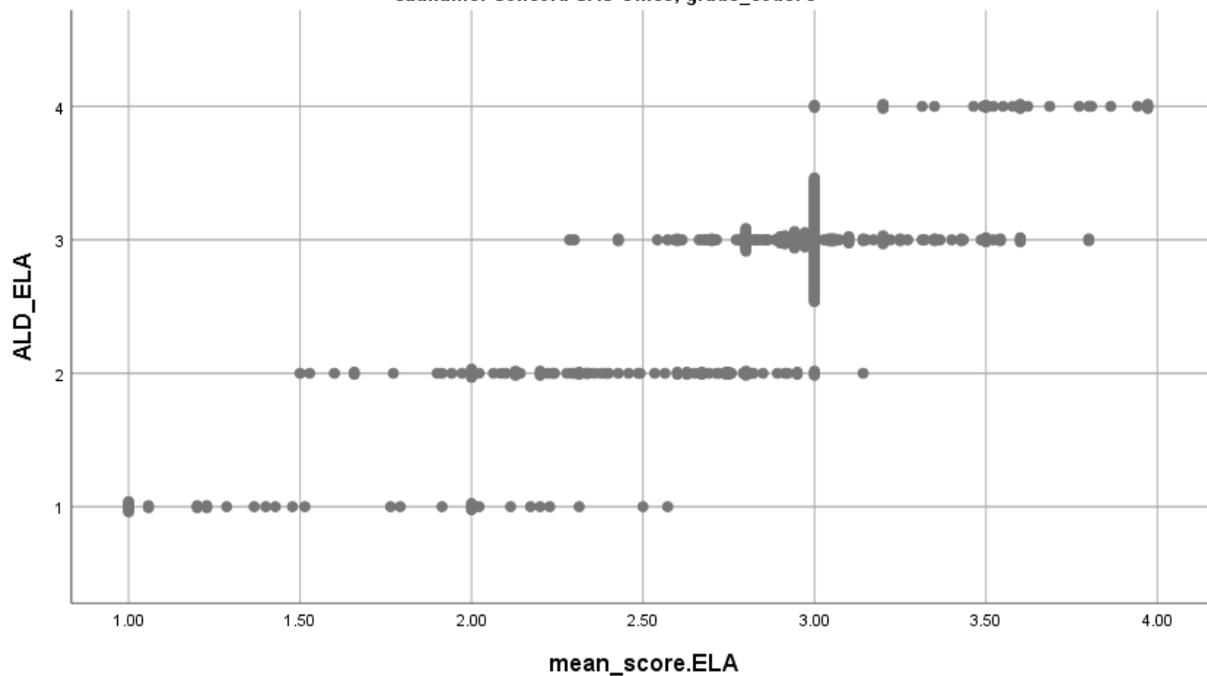
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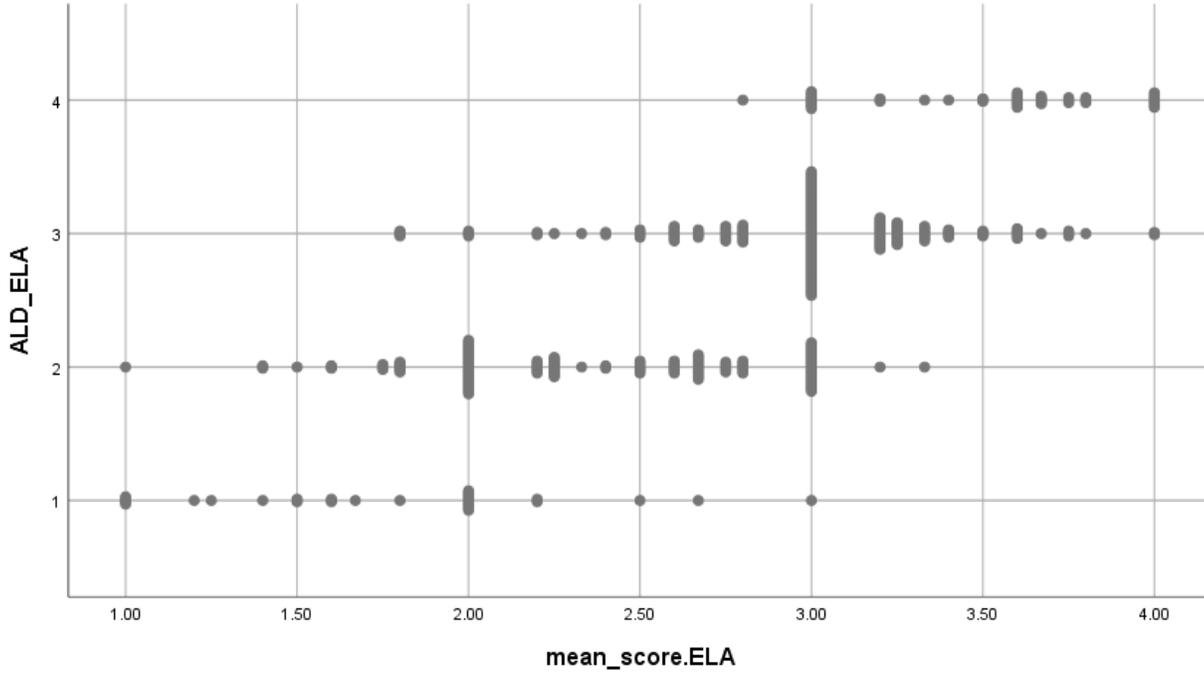
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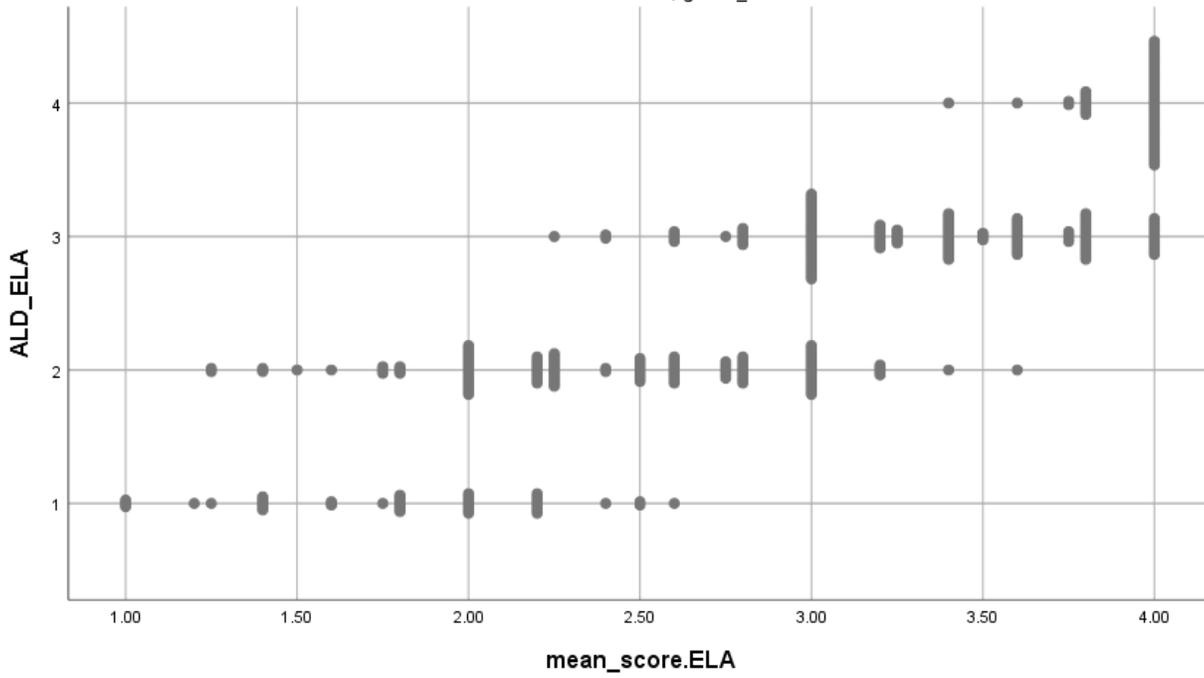
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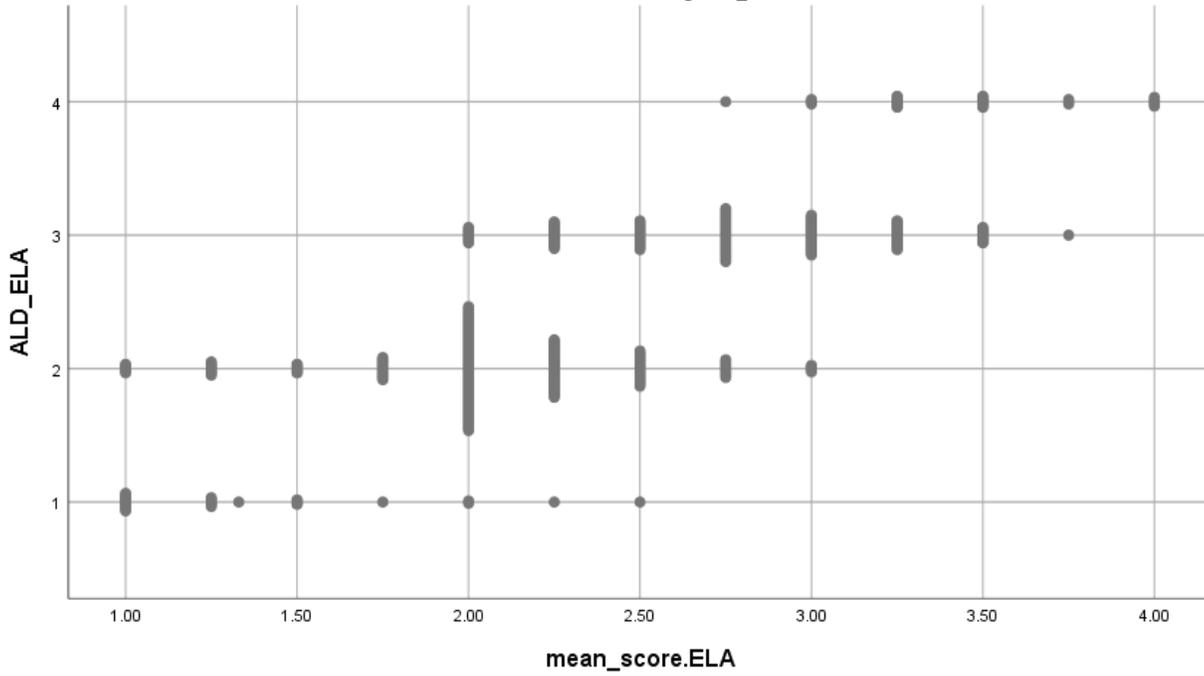
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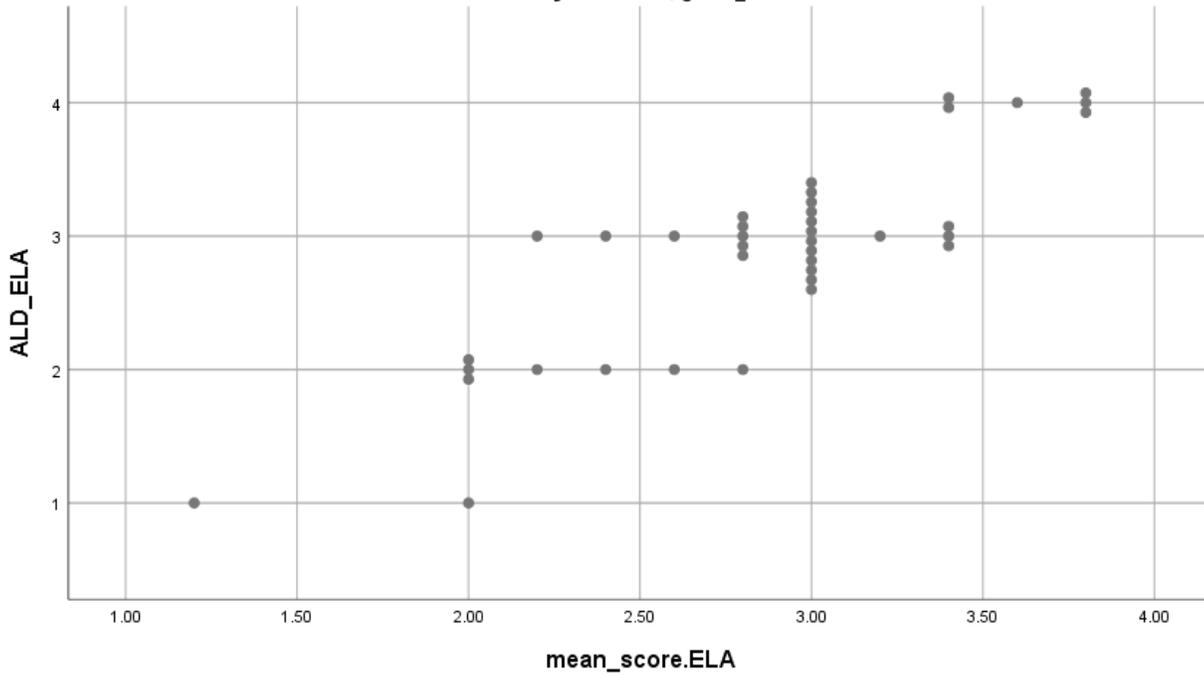
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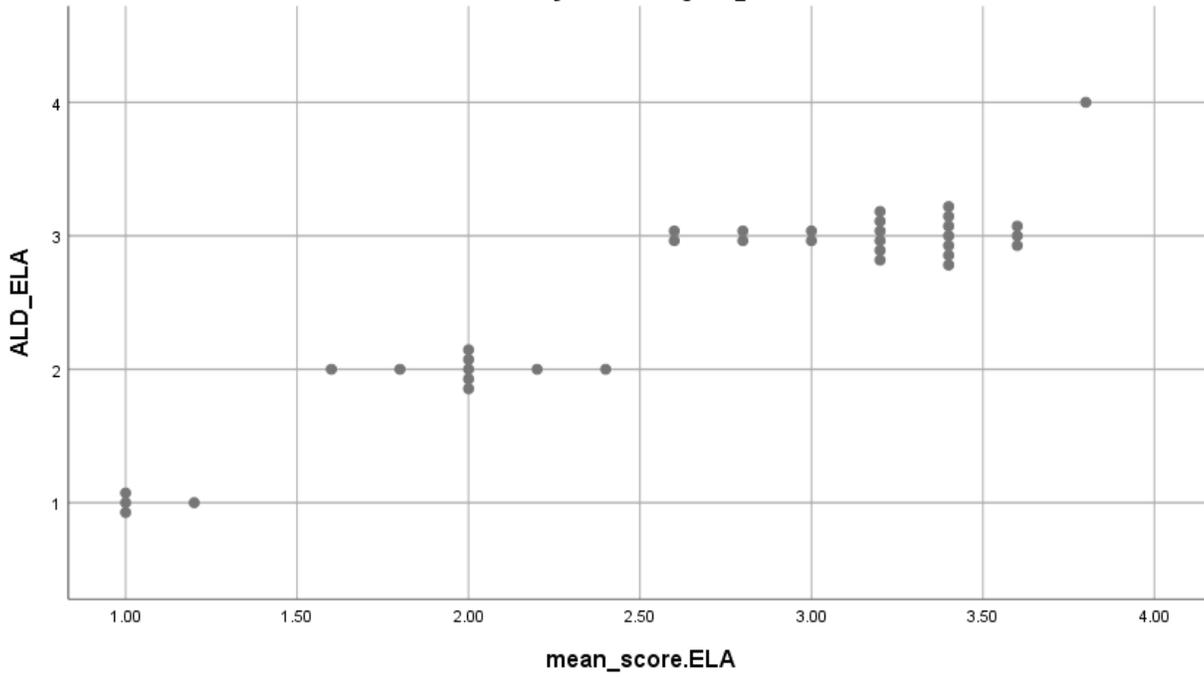
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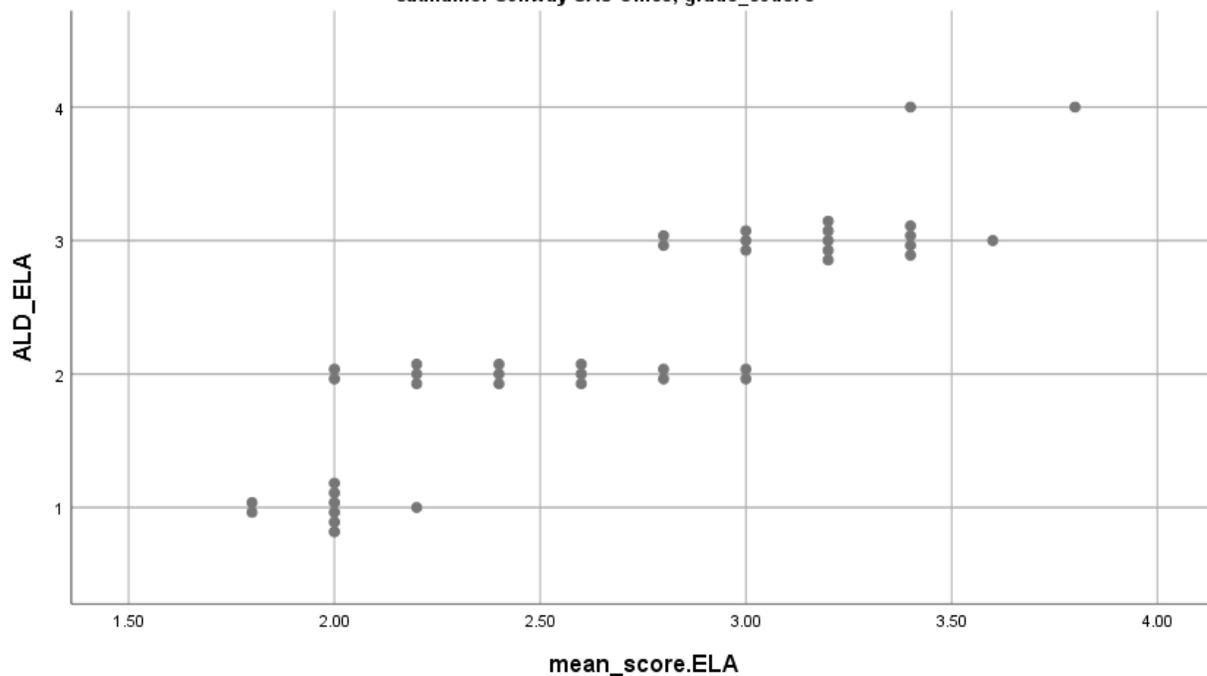
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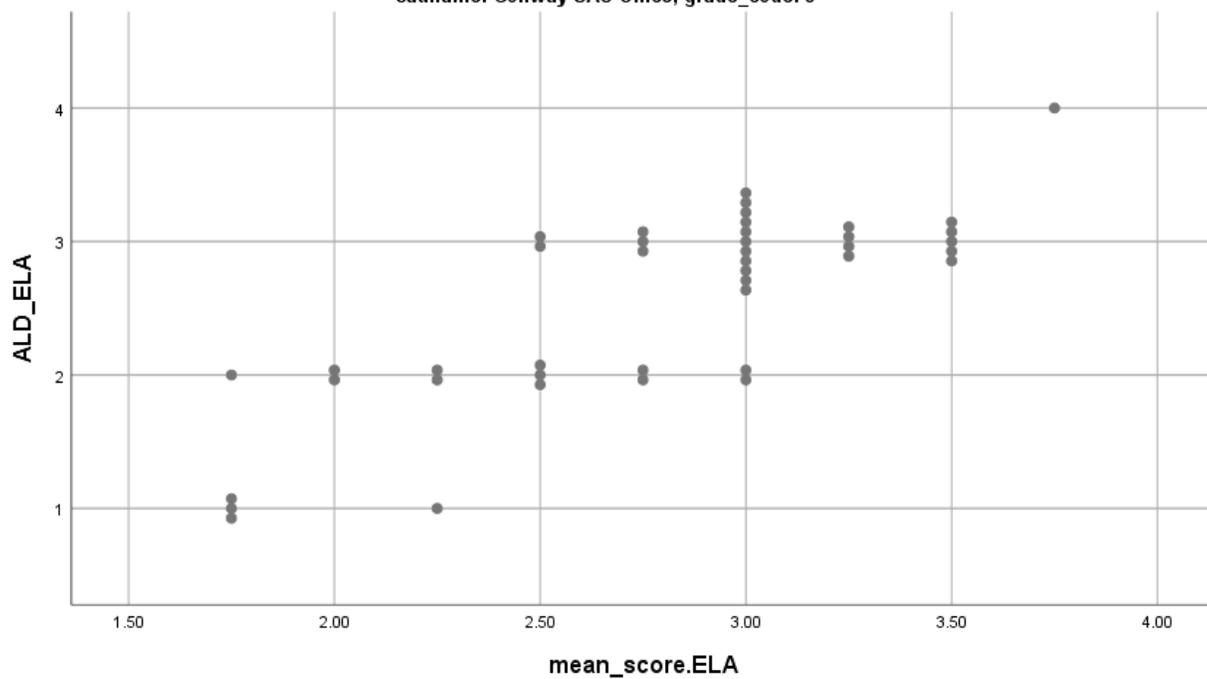
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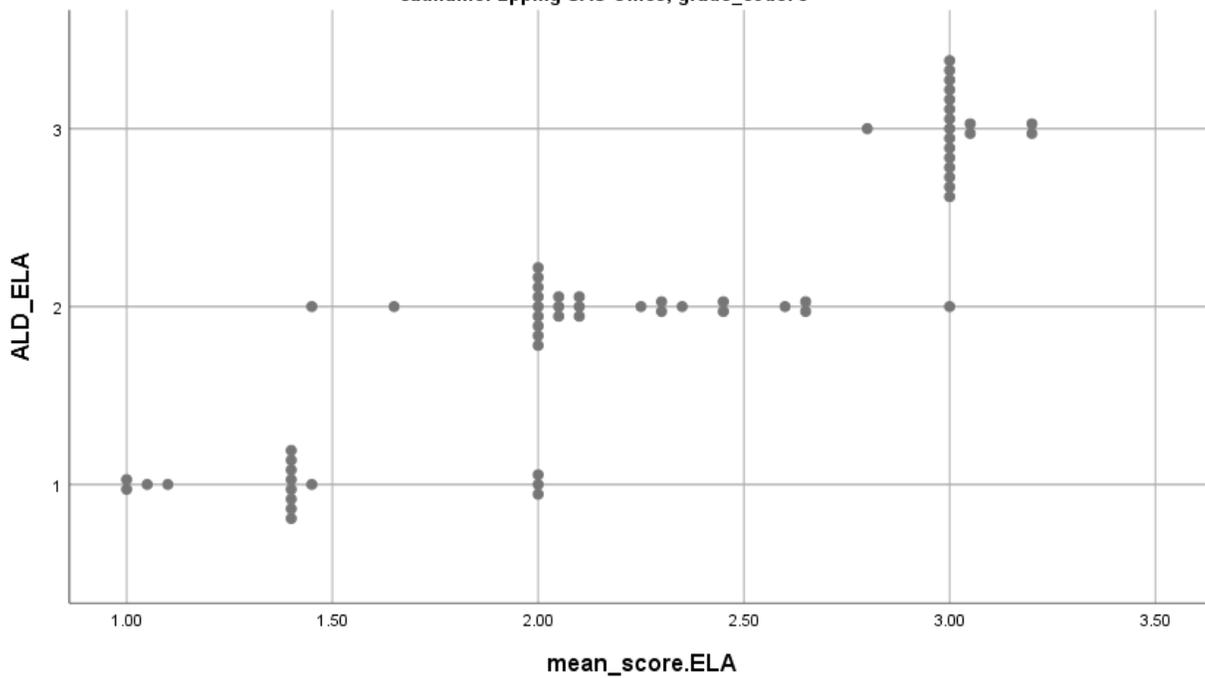
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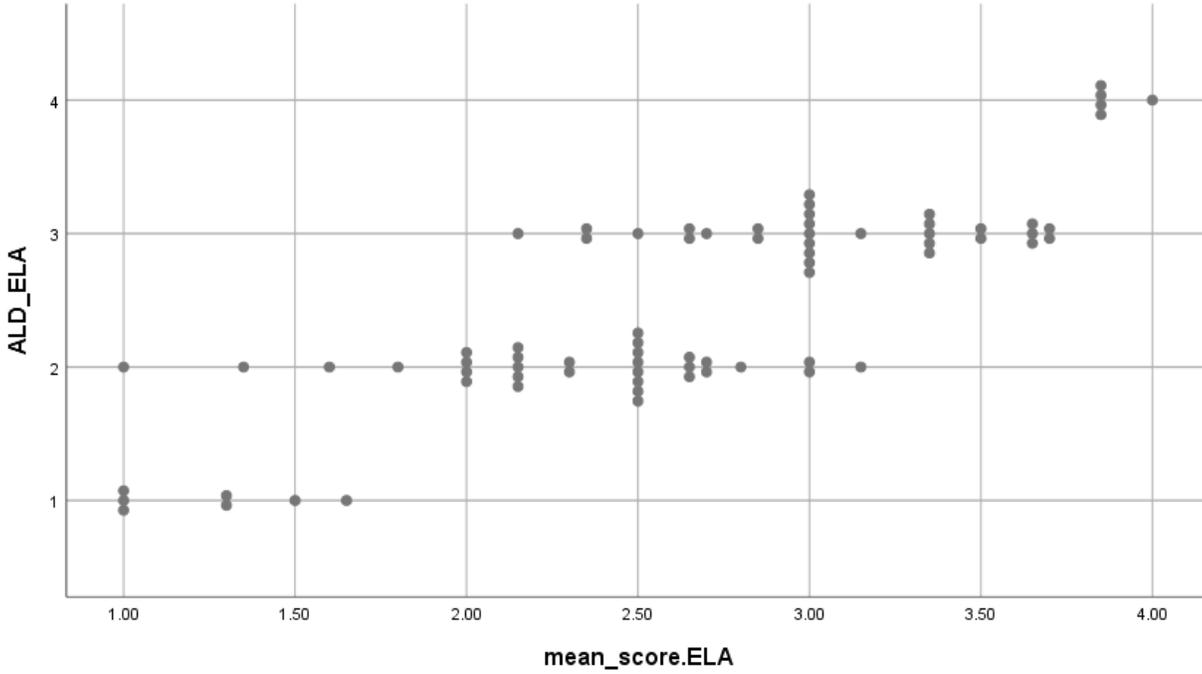
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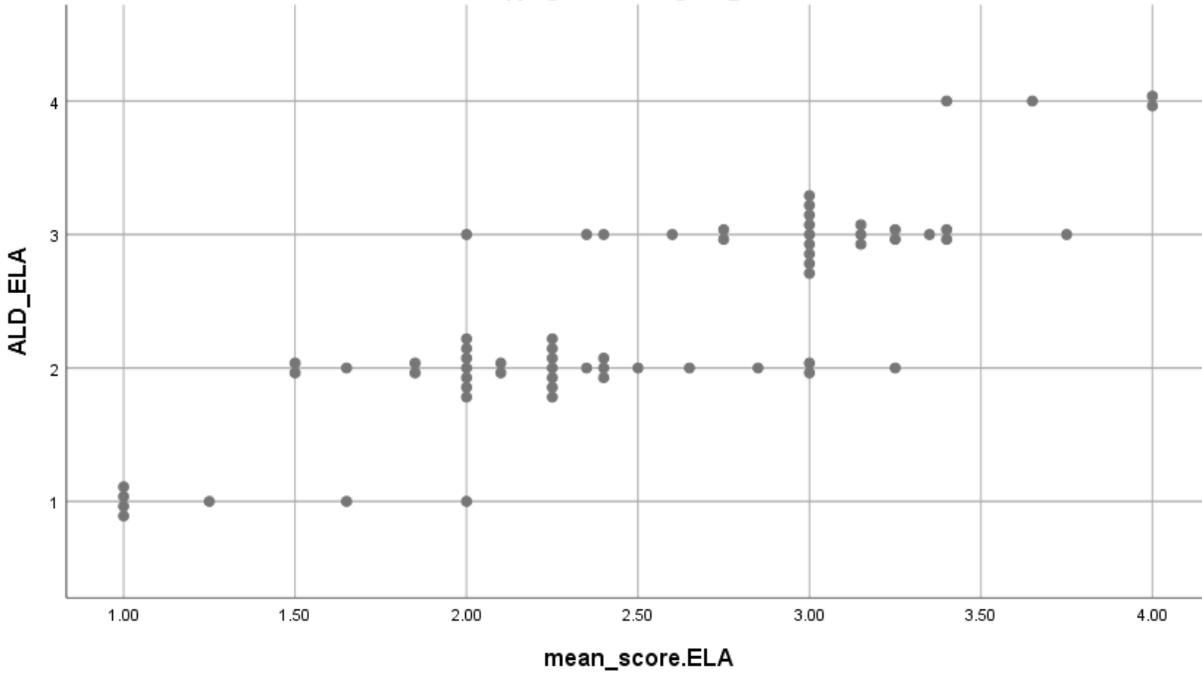
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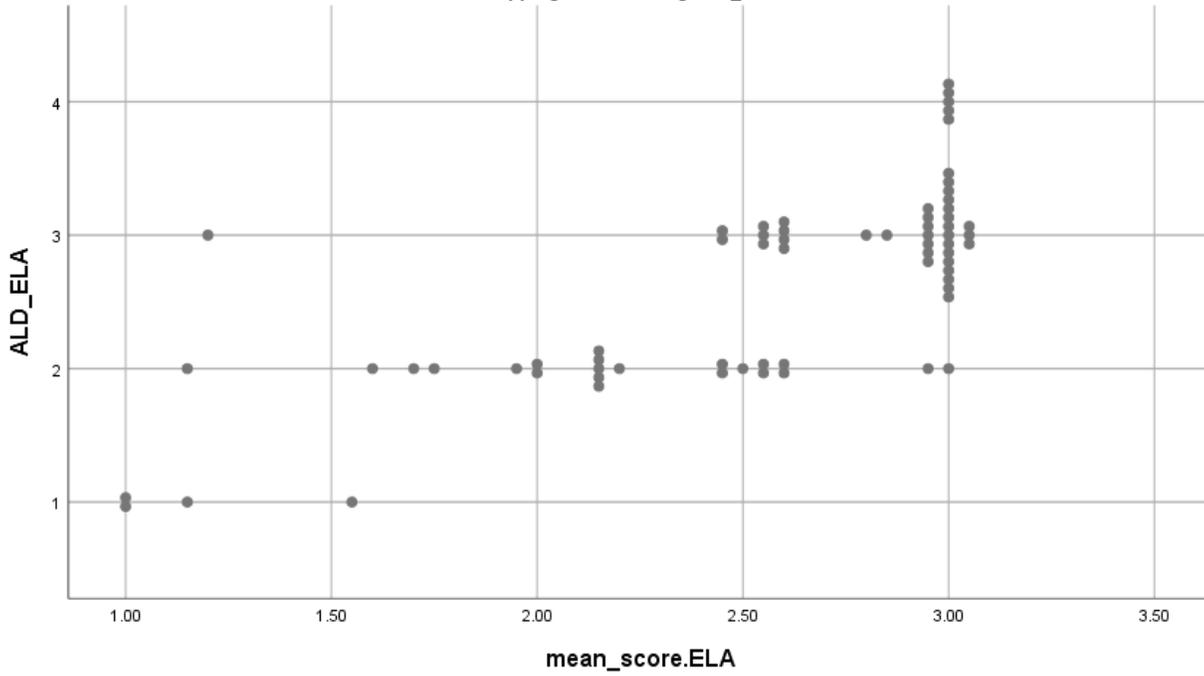
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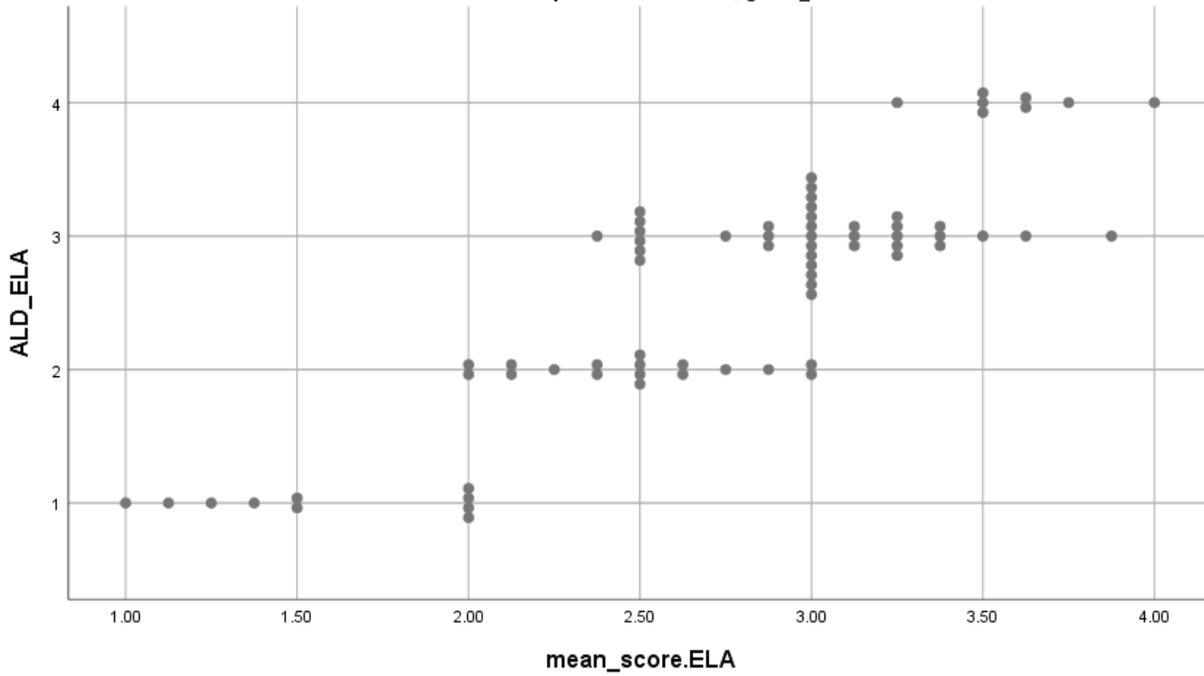
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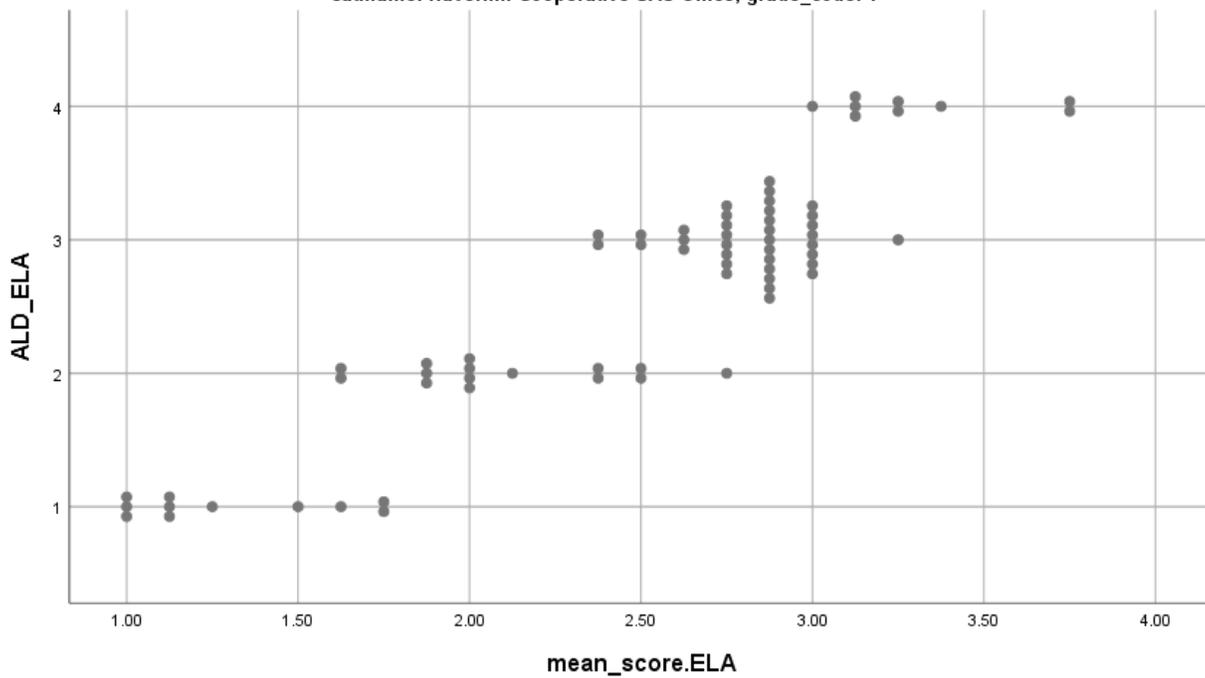
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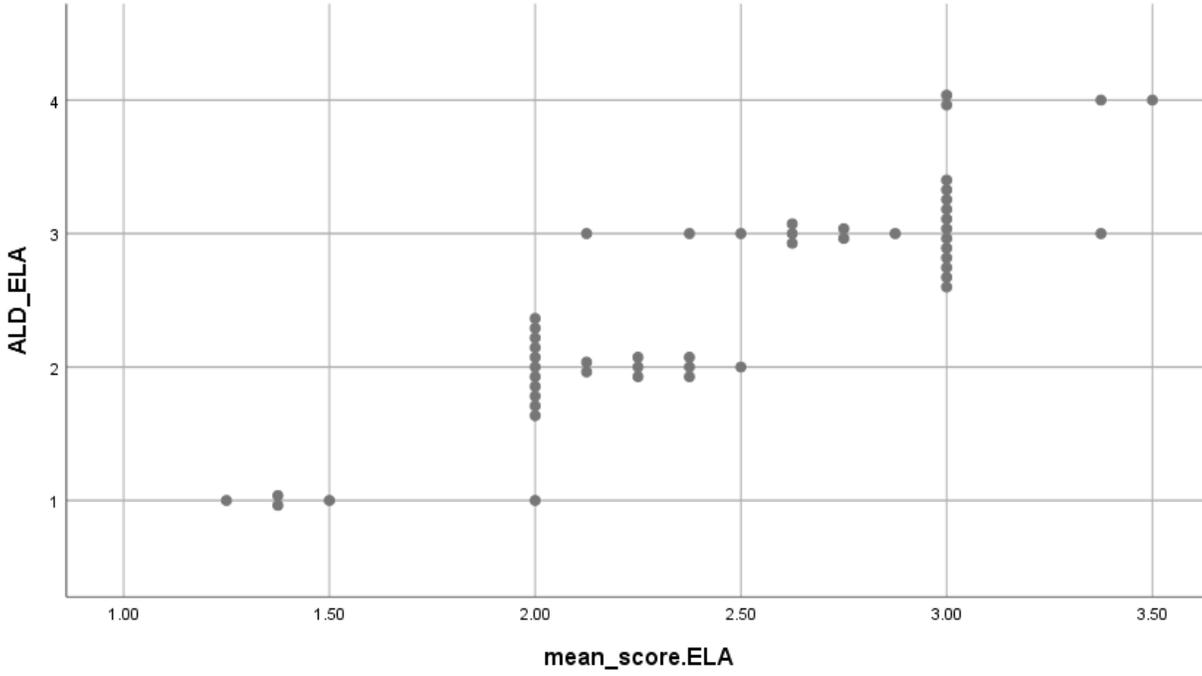
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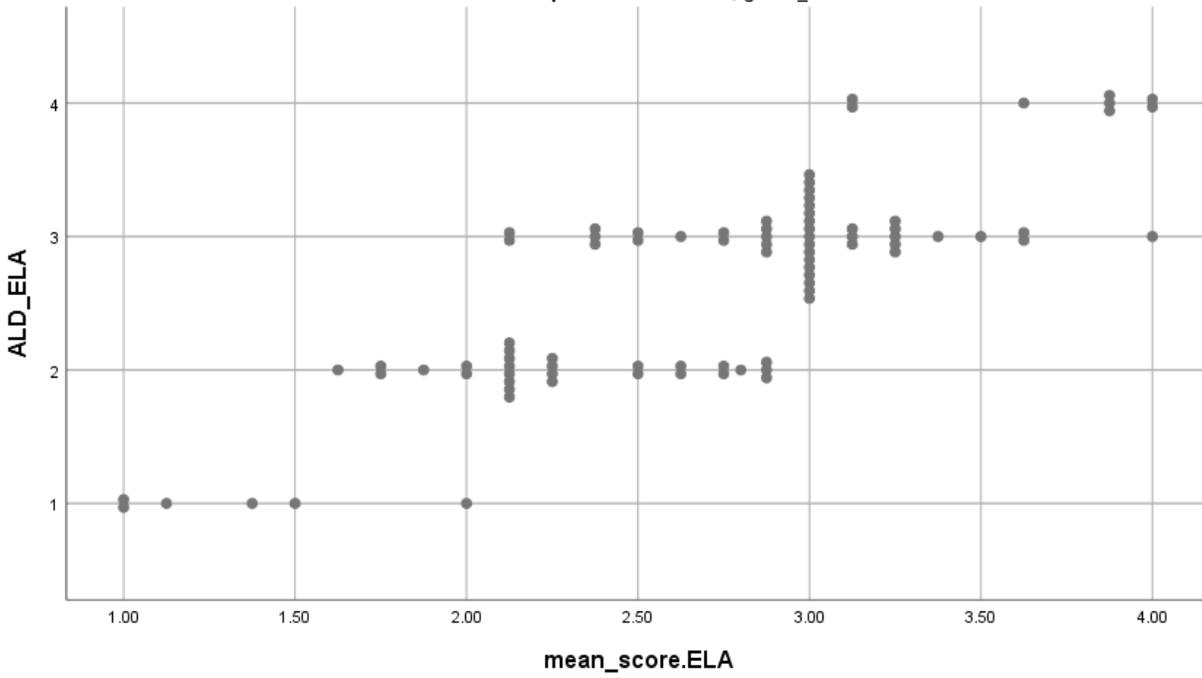
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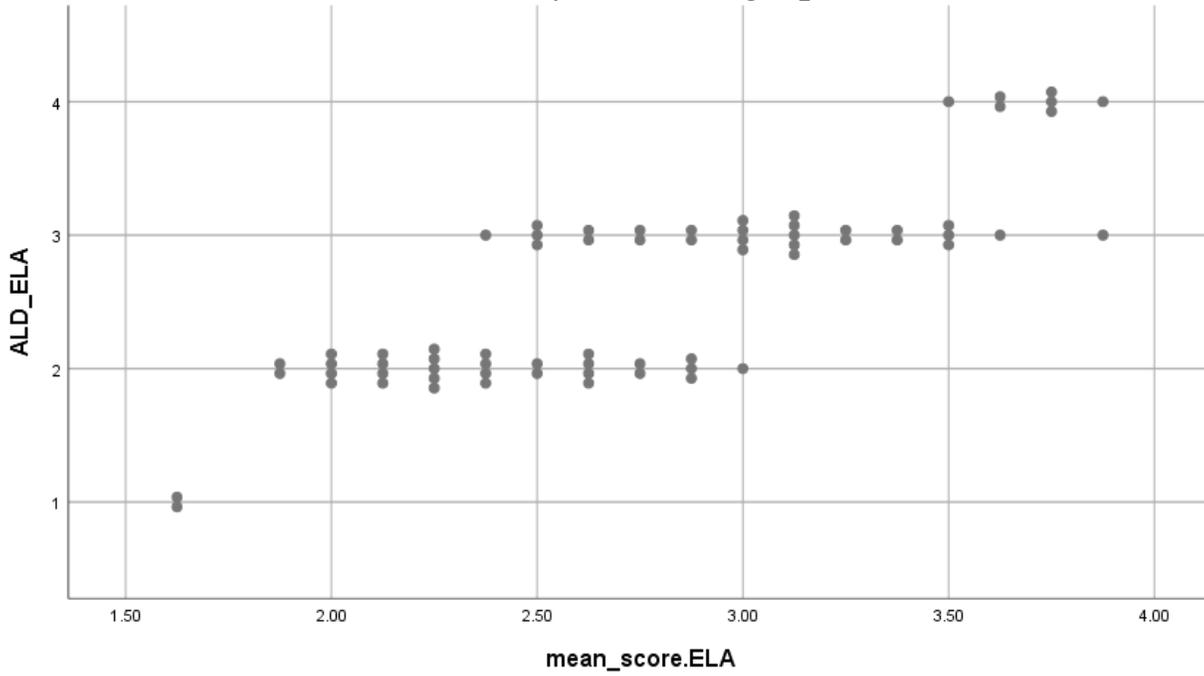
sauname: Haverhill Cooperative SAU Office, grade_code: 5



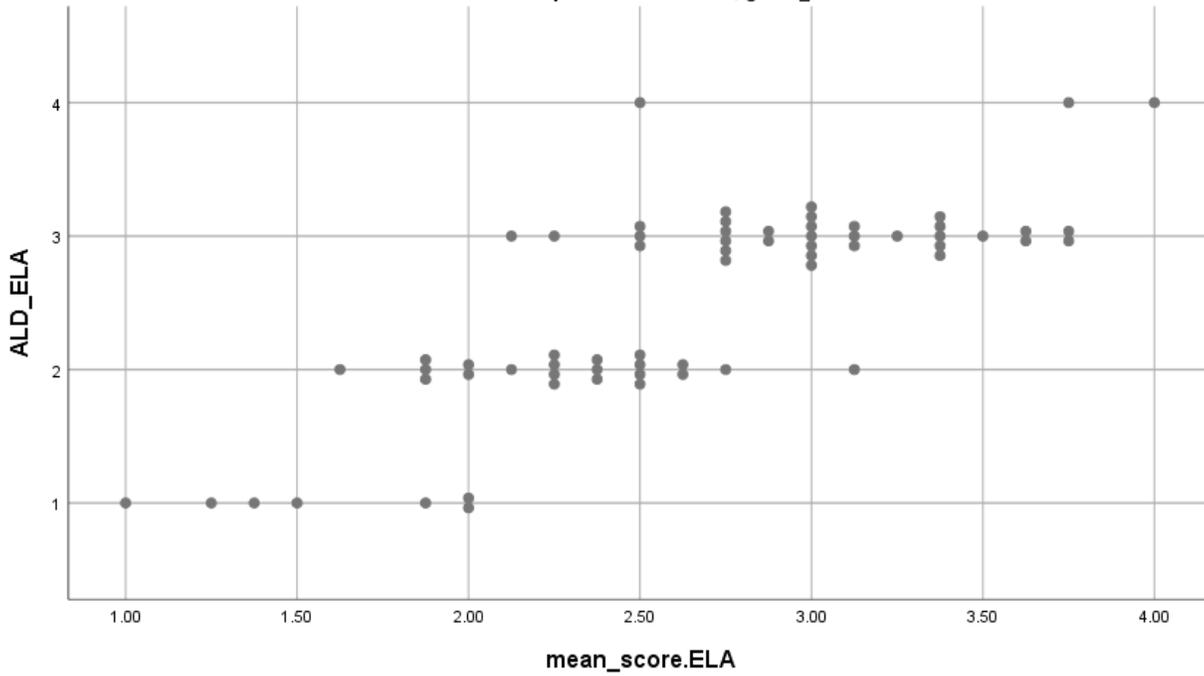
sauname: Haverhill Cooperative SAU Office, grade_code: 6



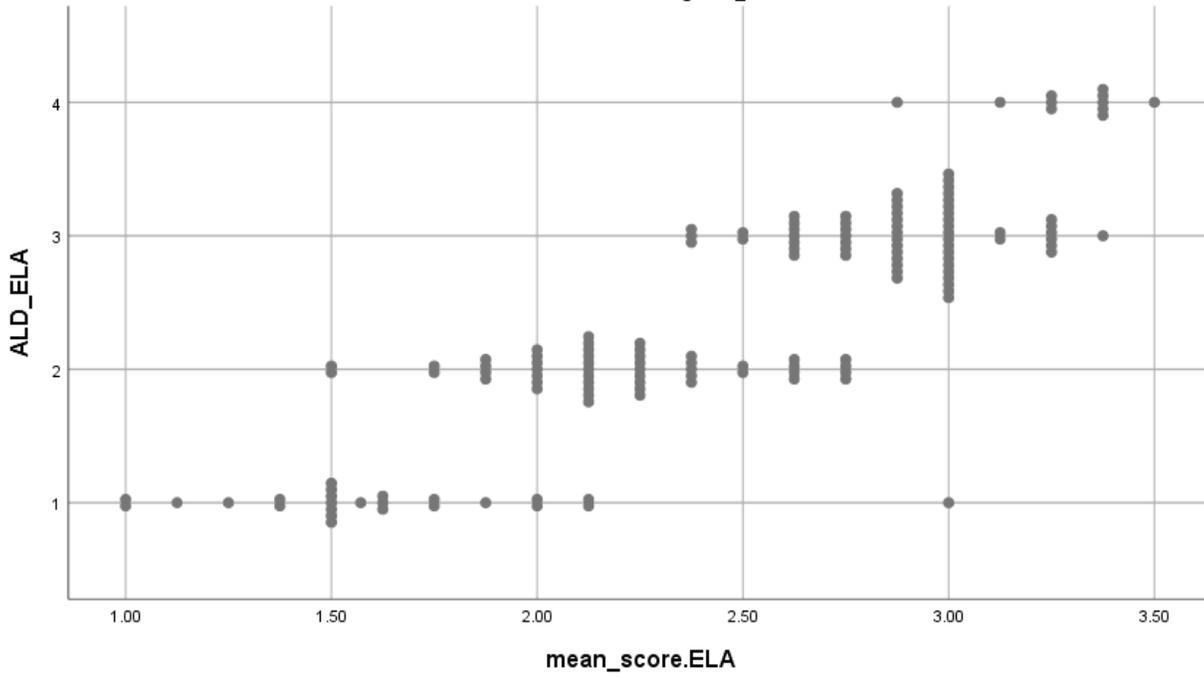
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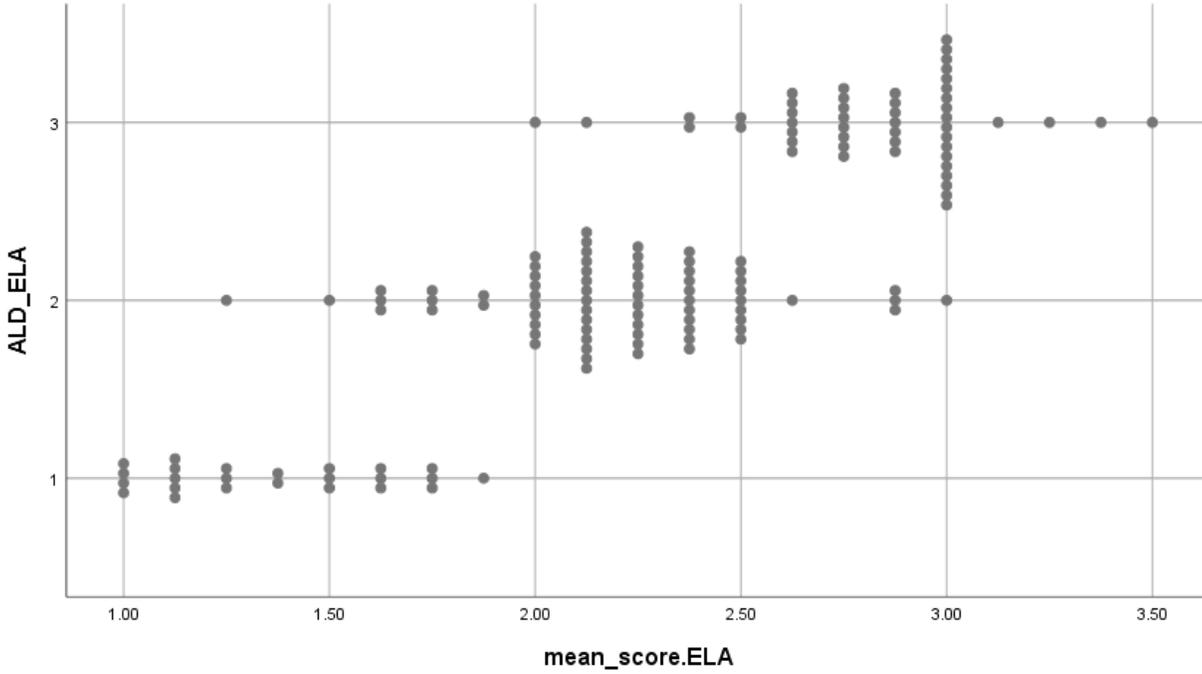
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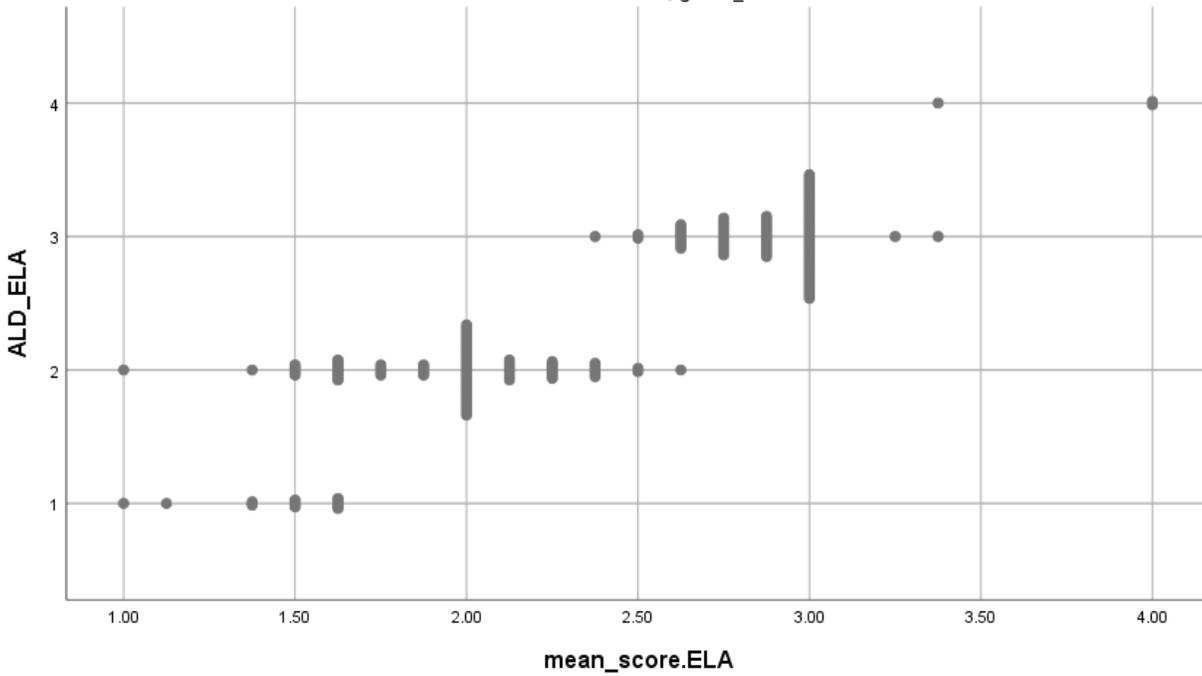
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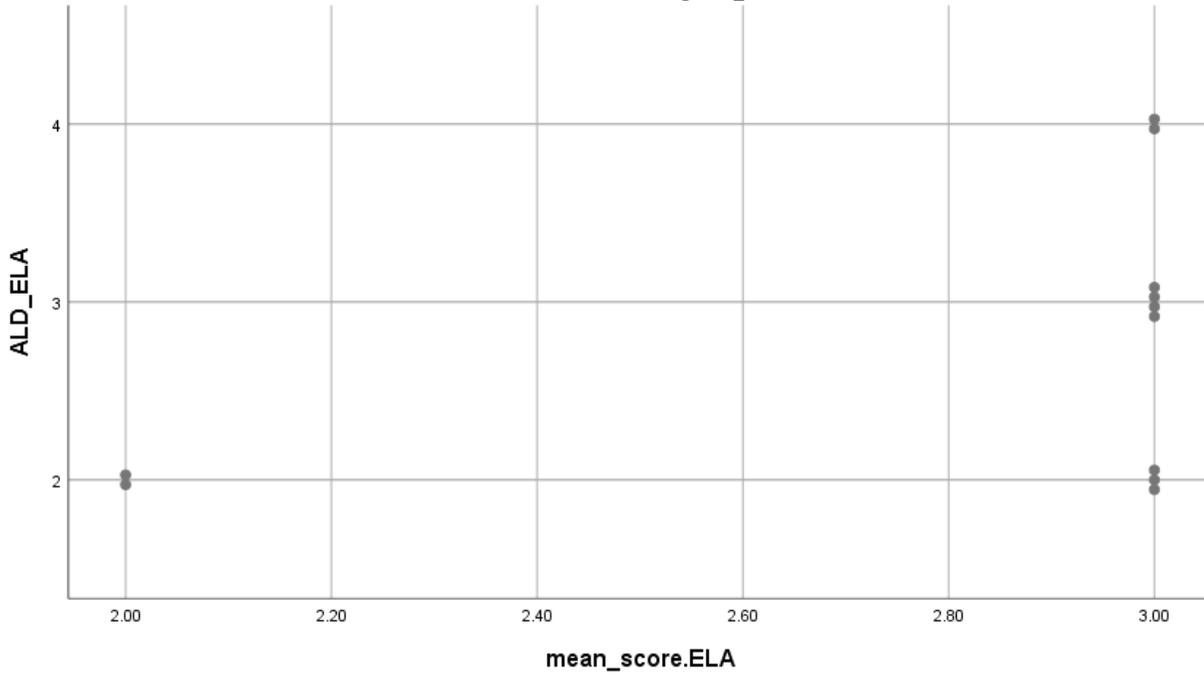
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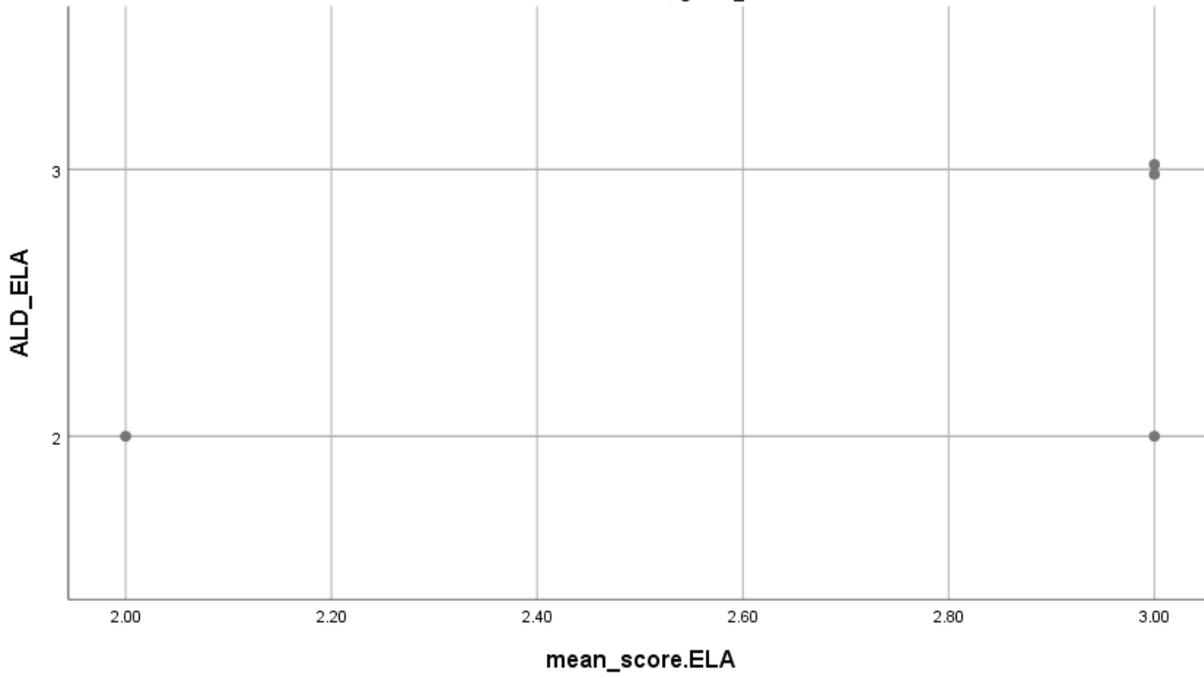
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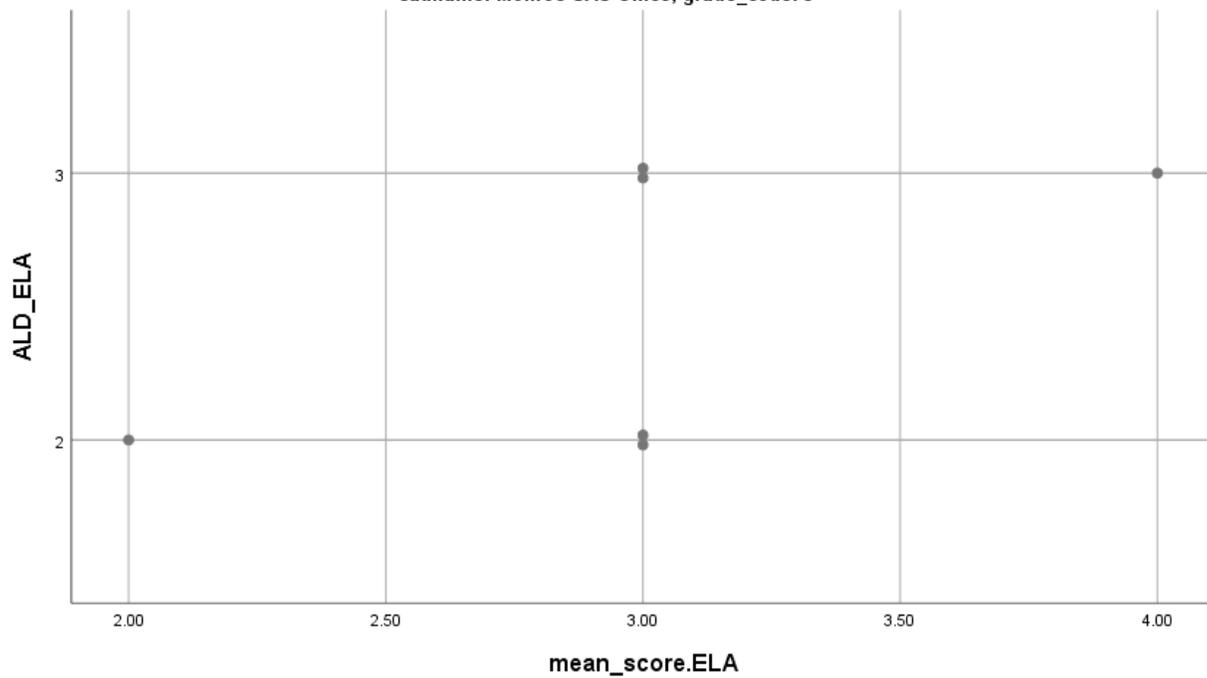
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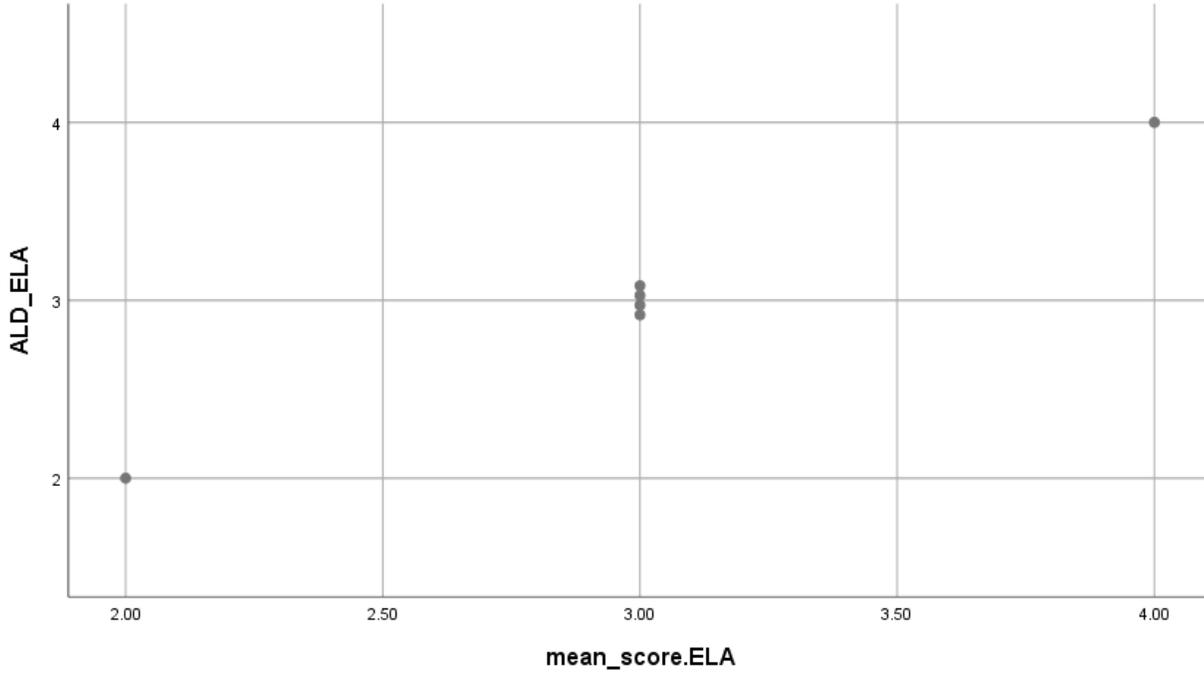
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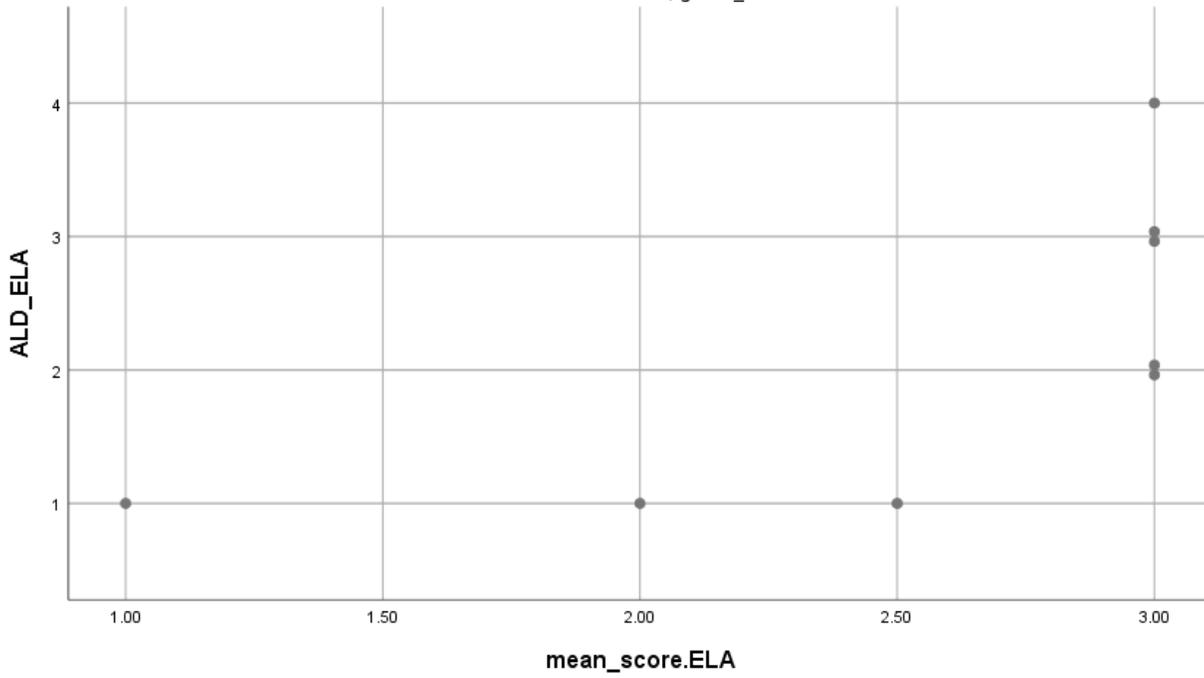
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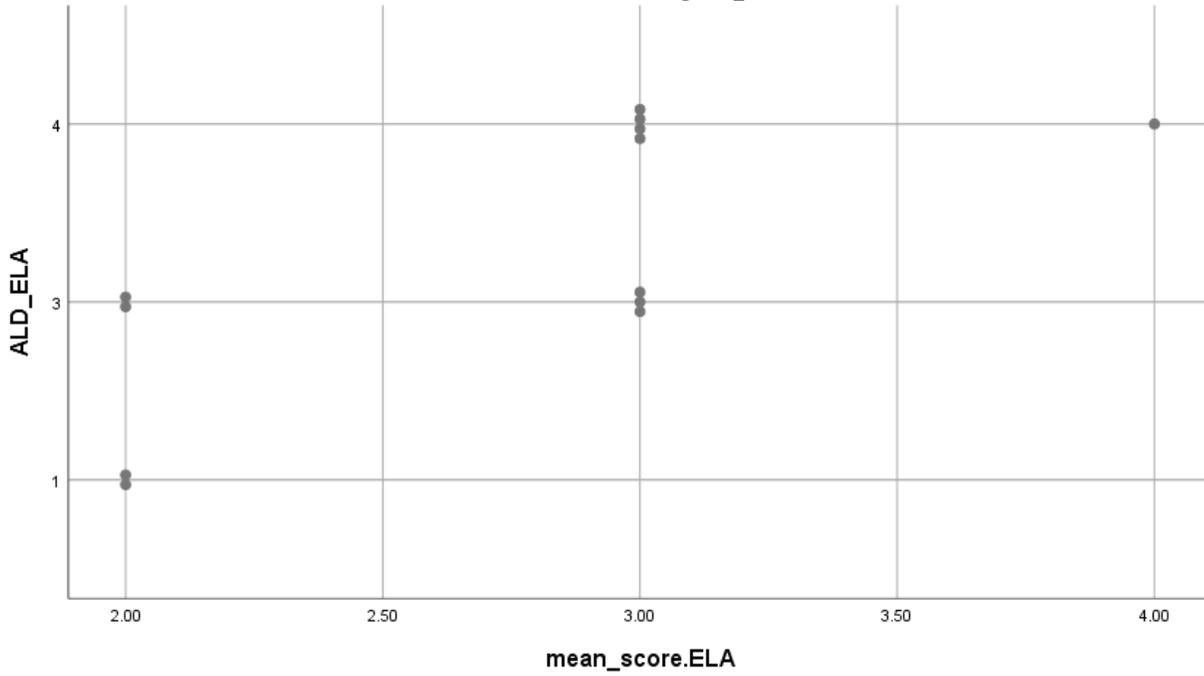
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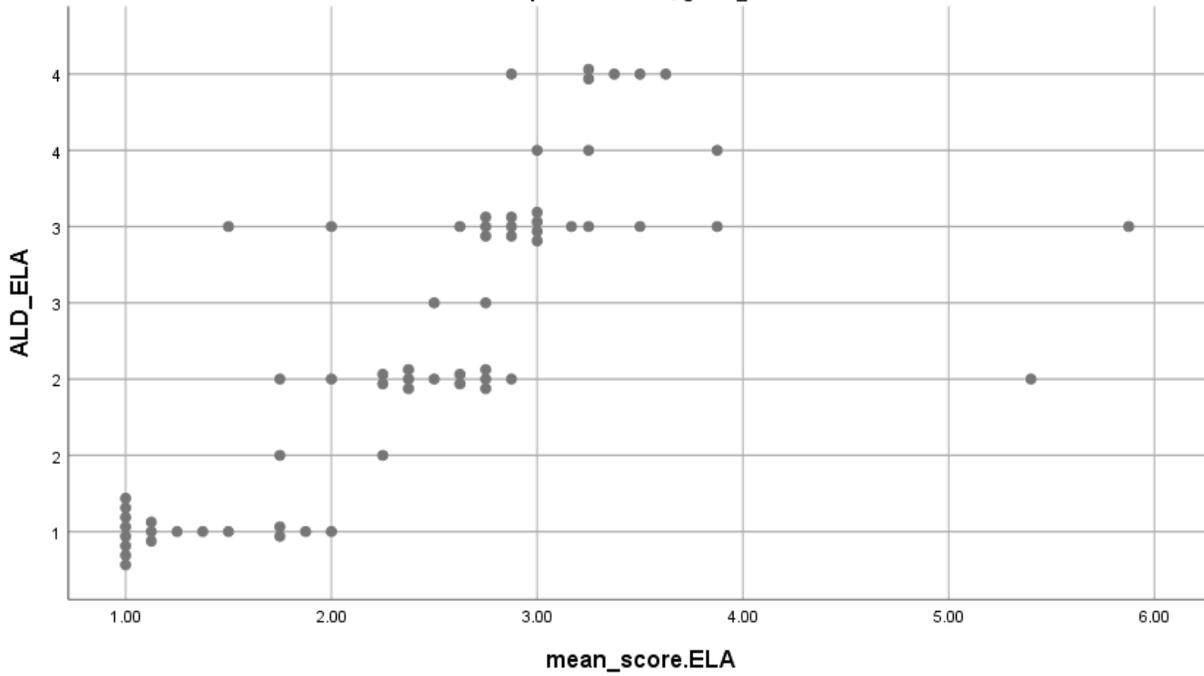
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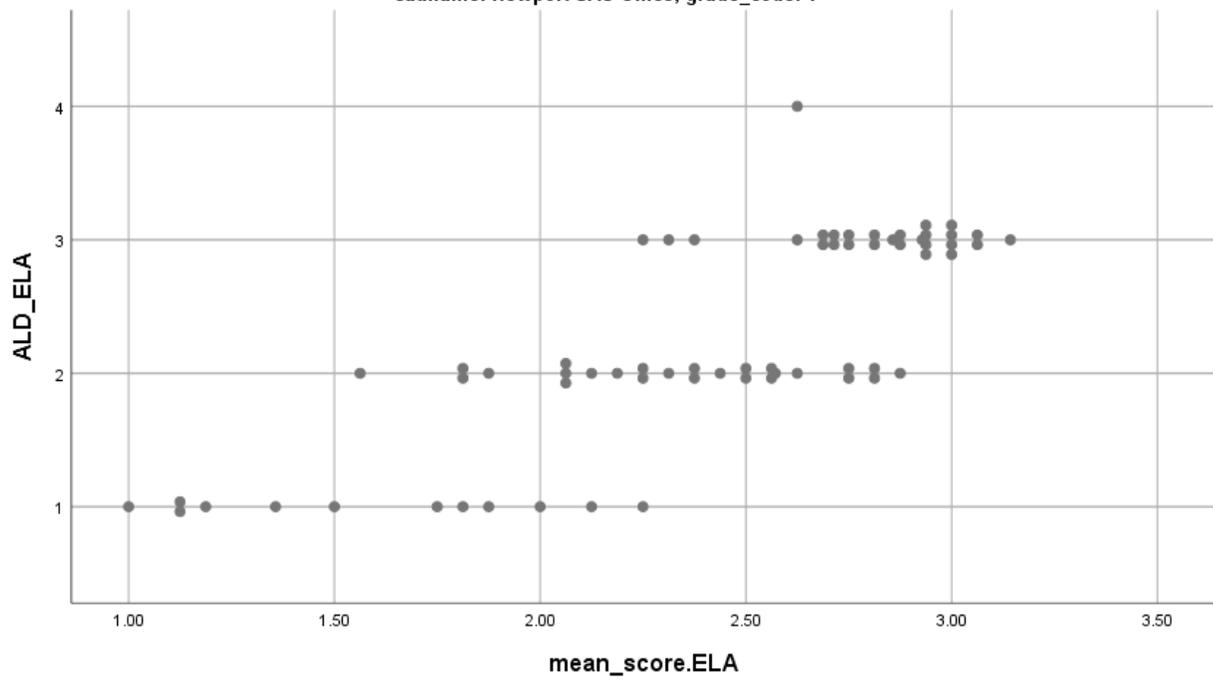
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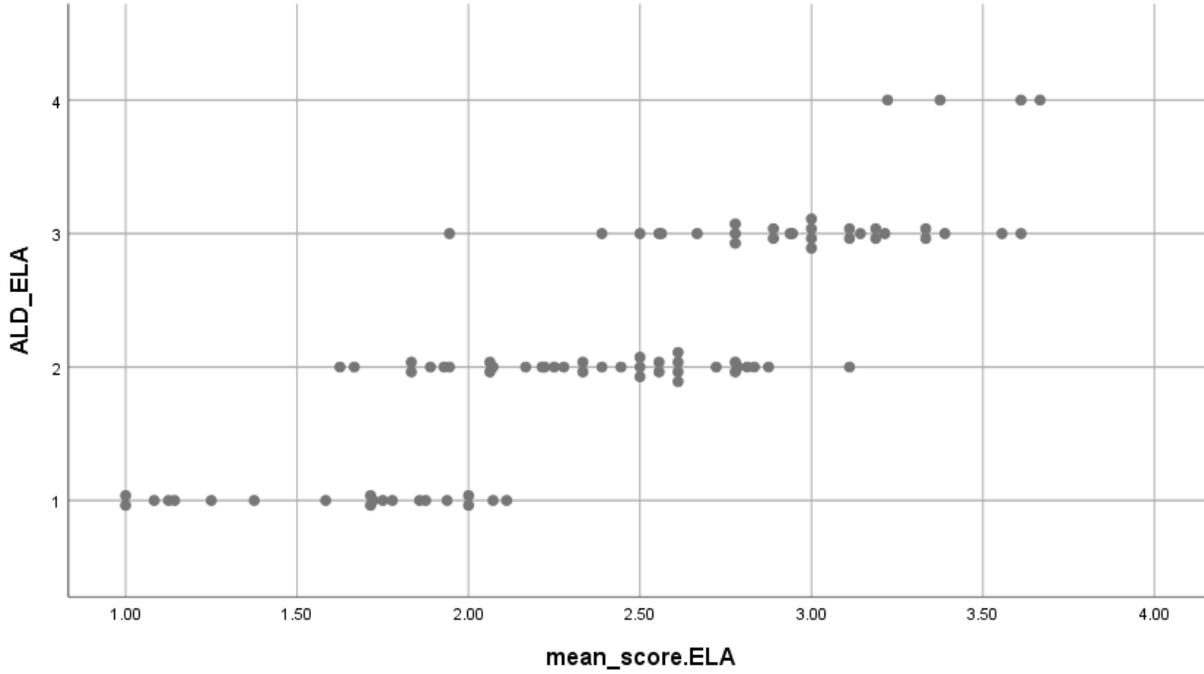
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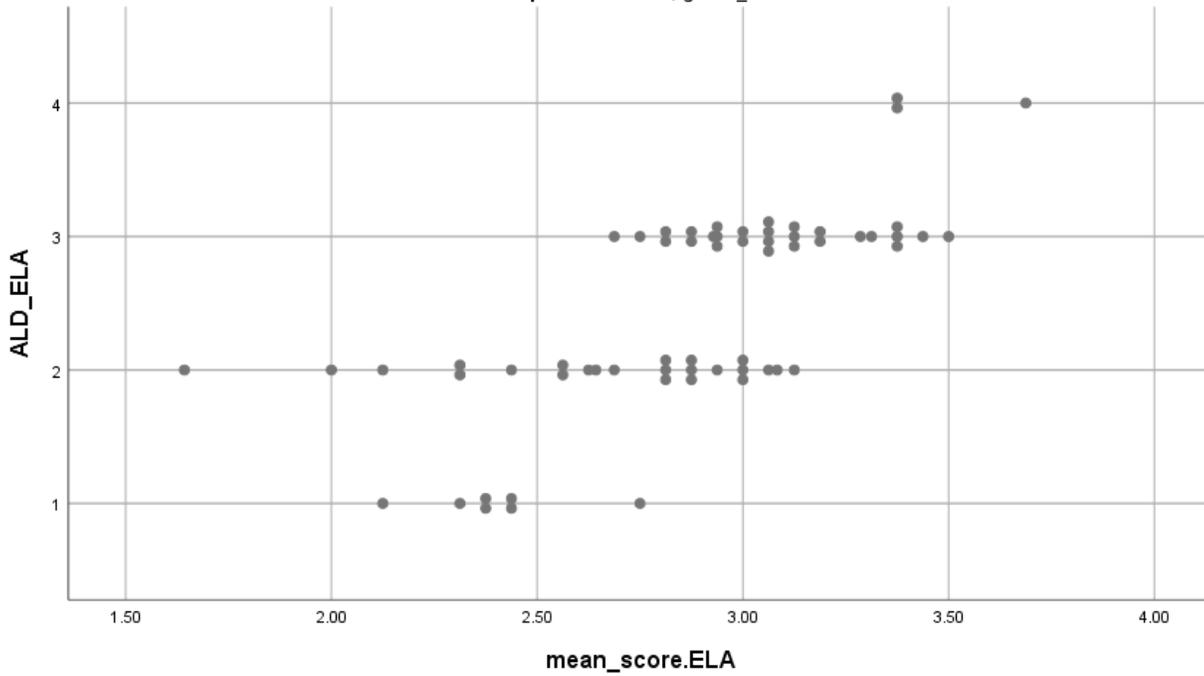
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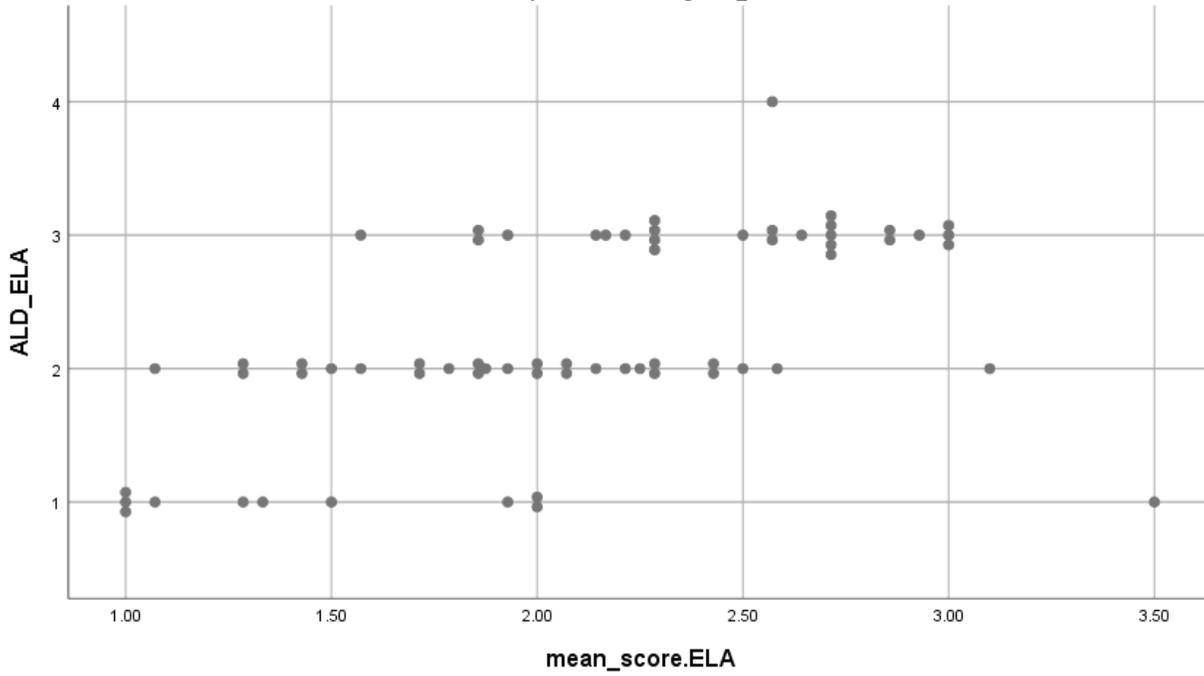
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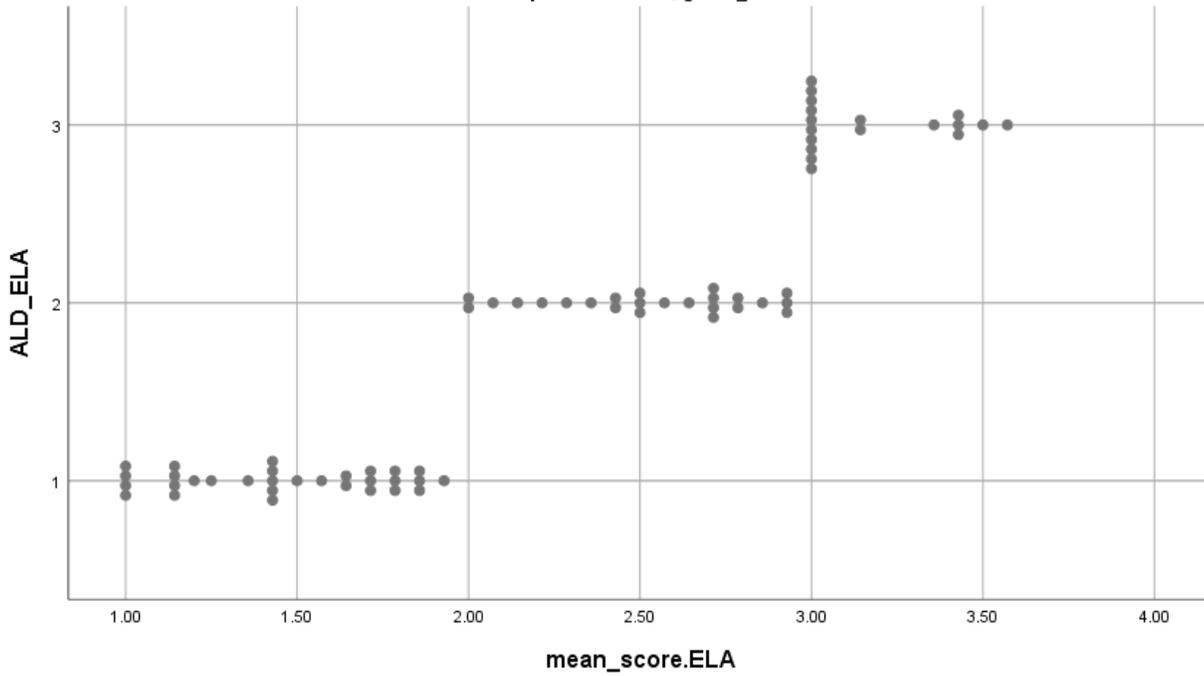
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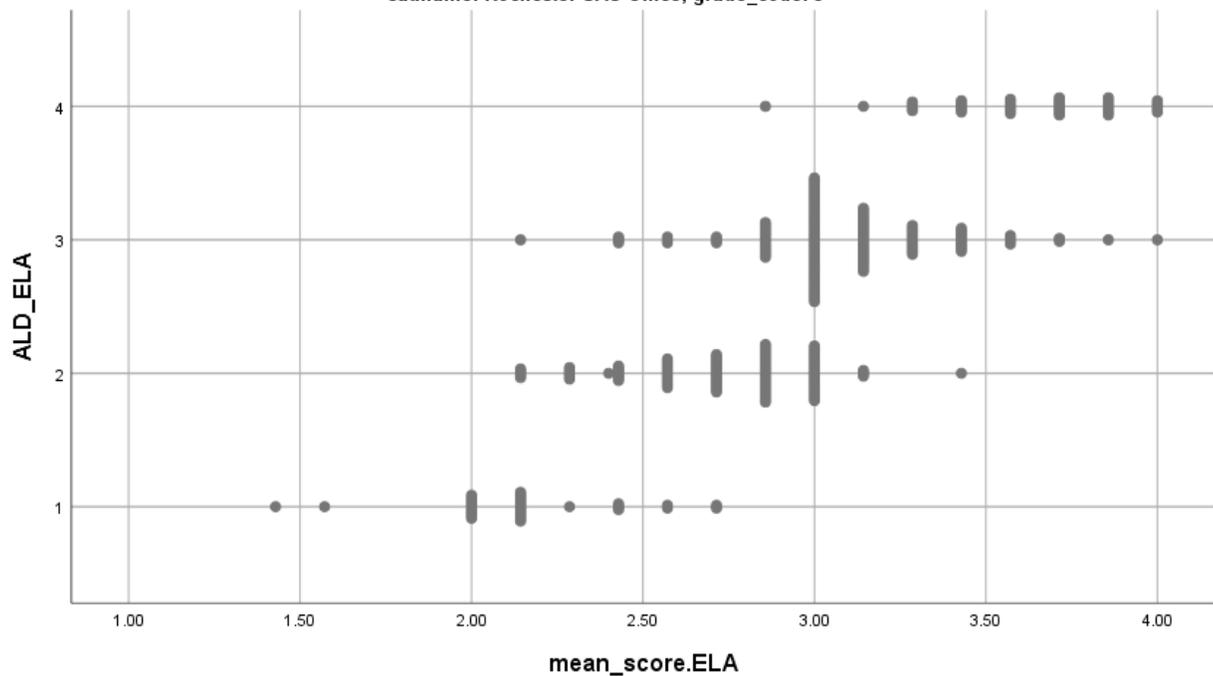
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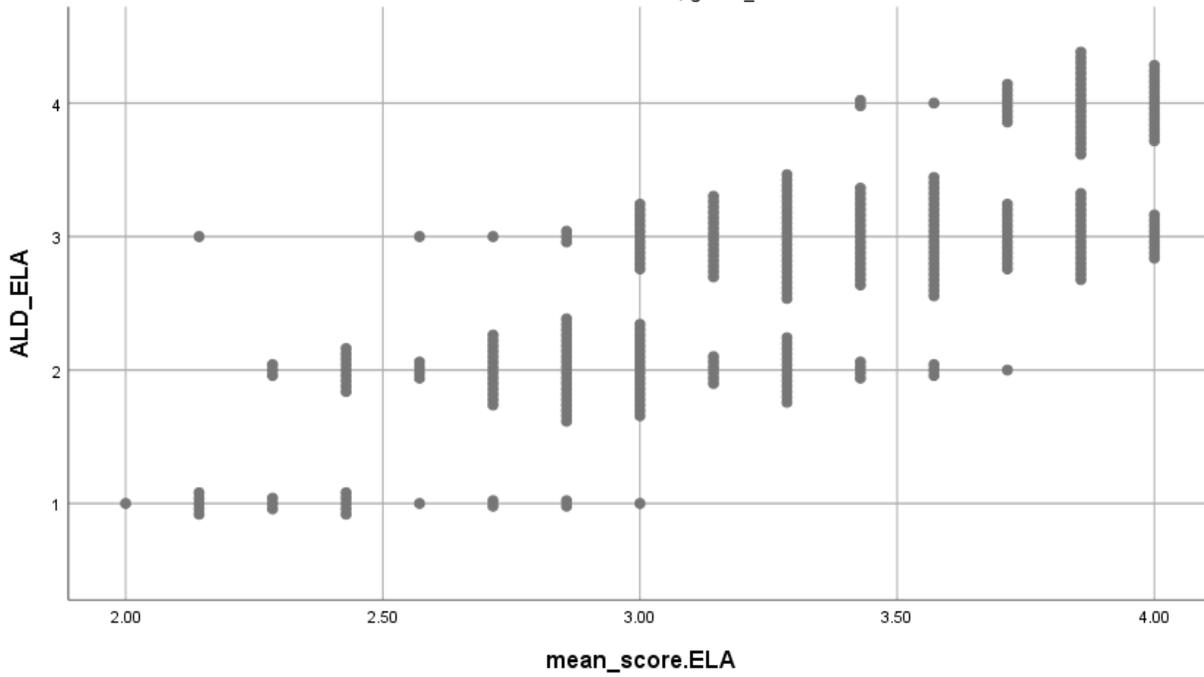
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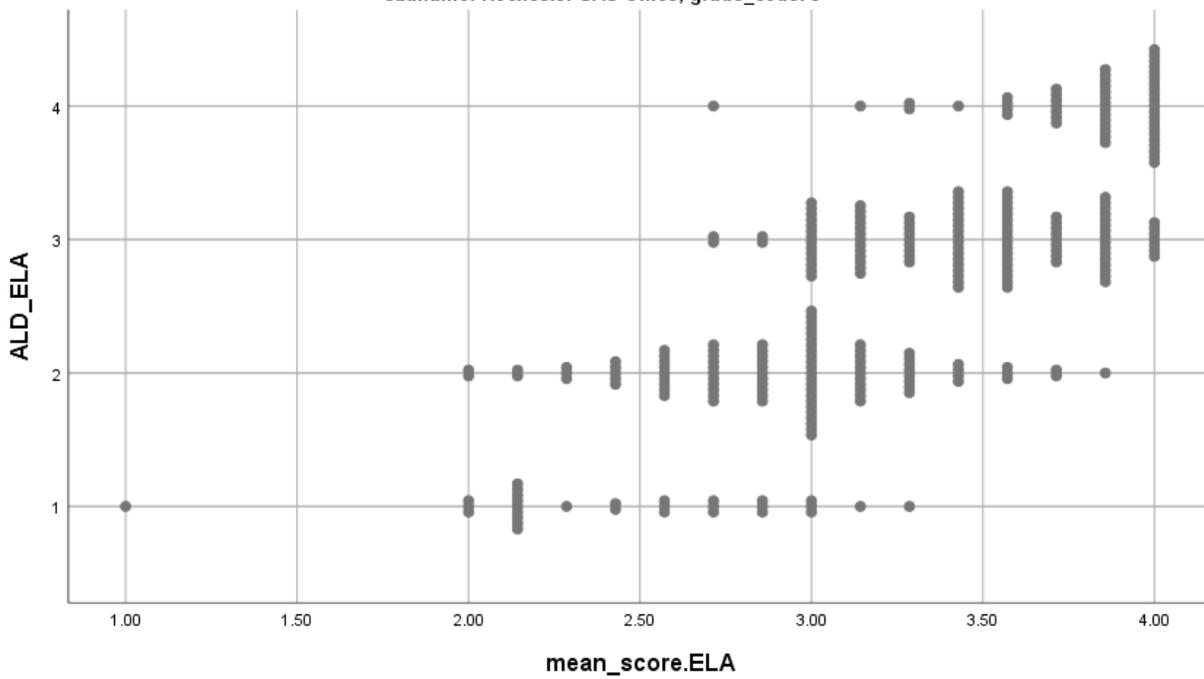
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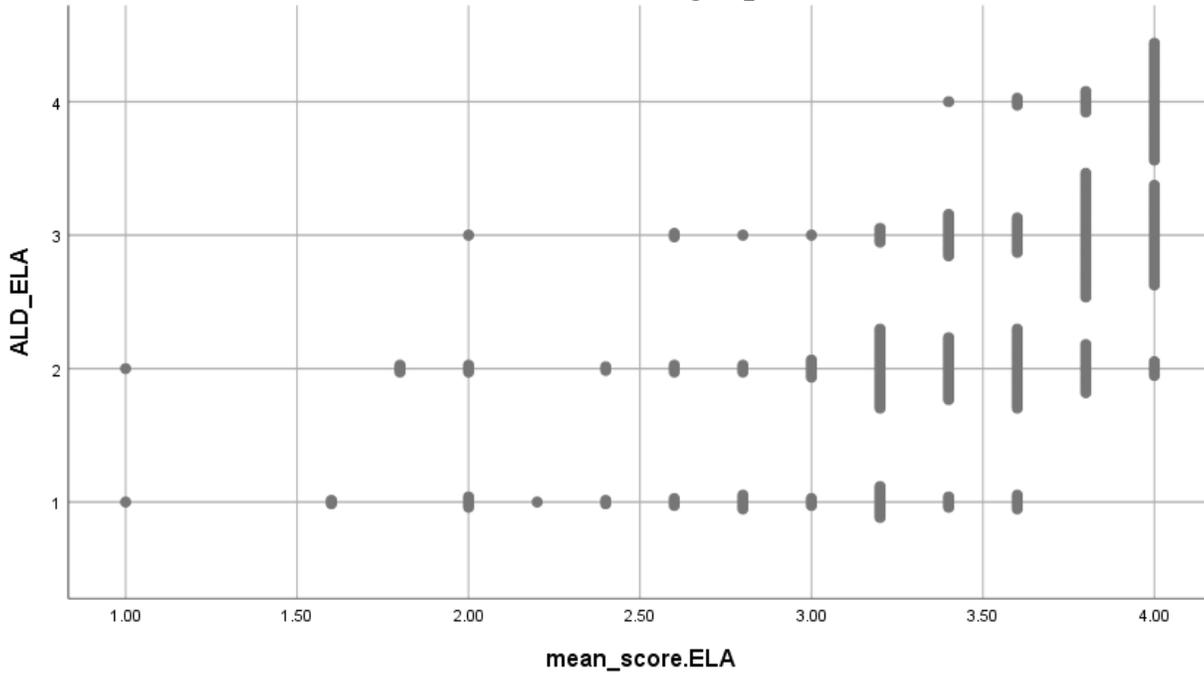
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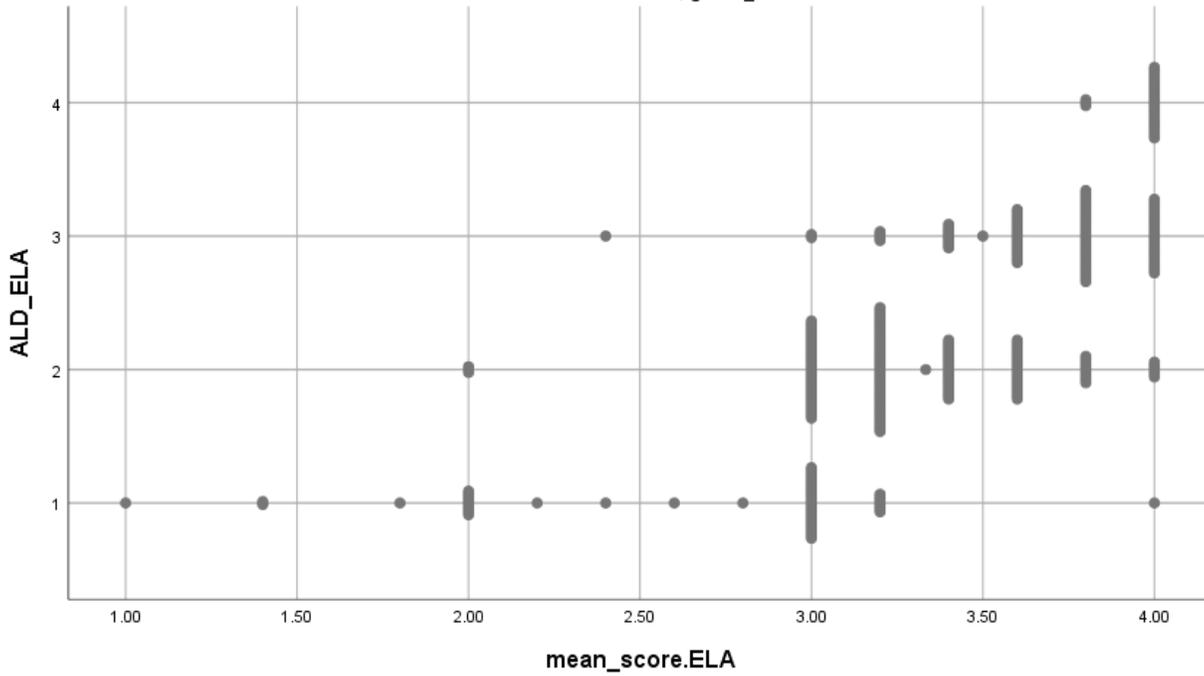
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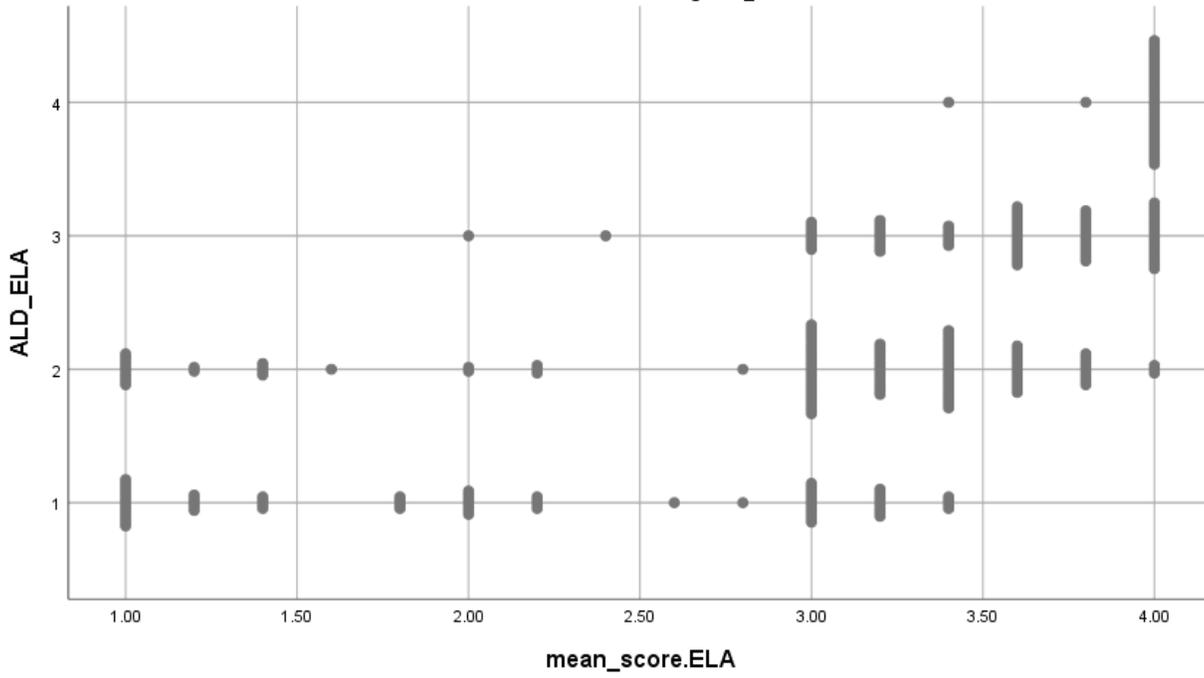
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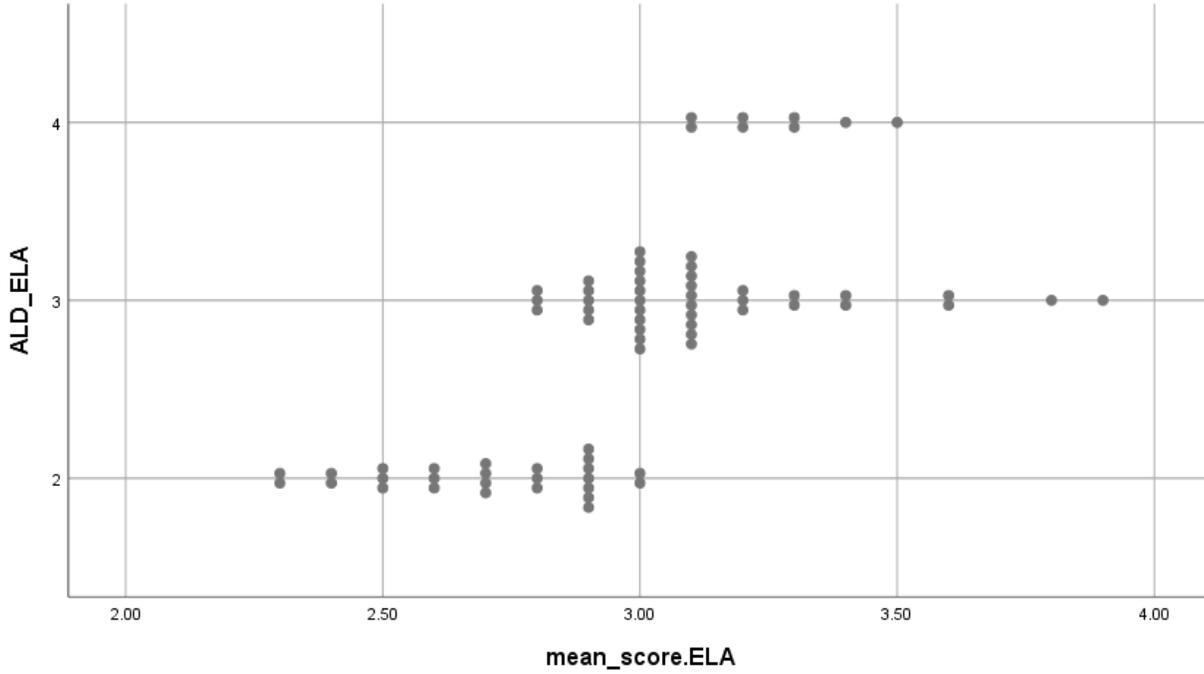
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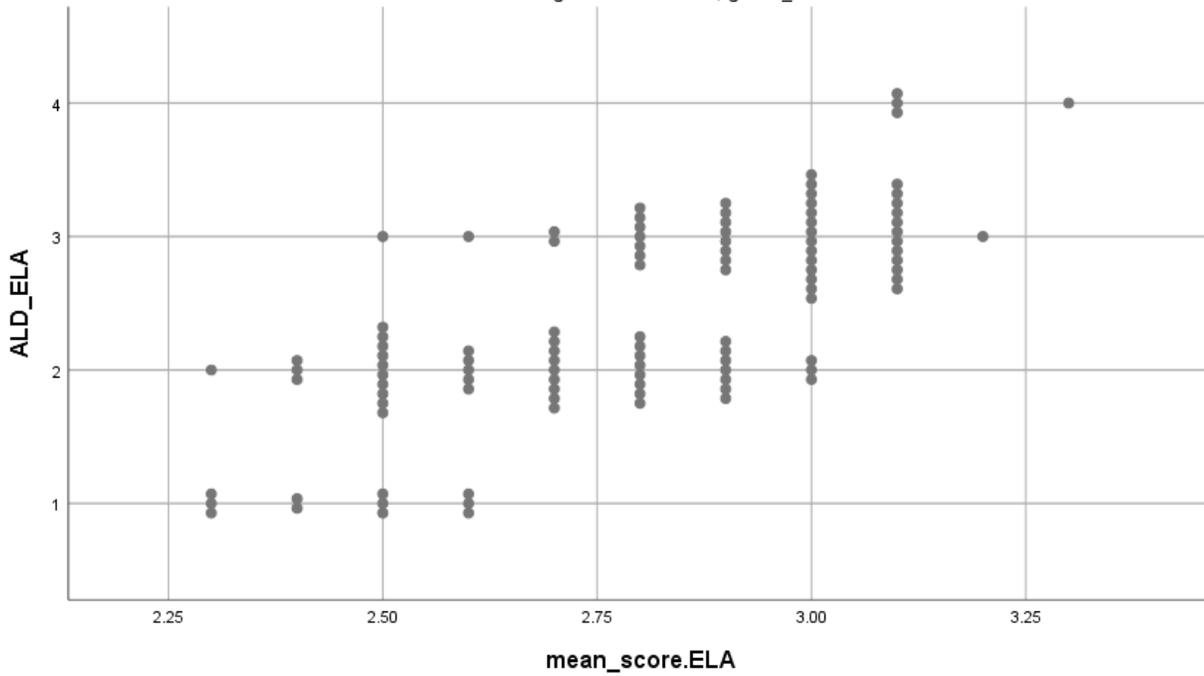
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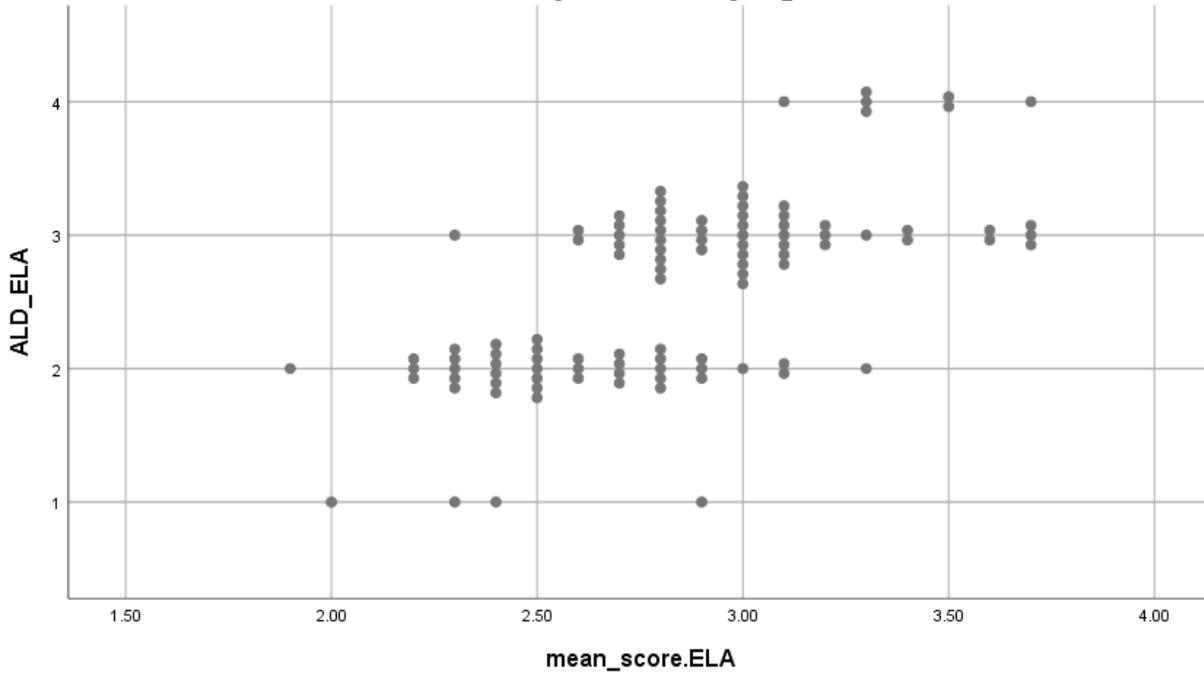
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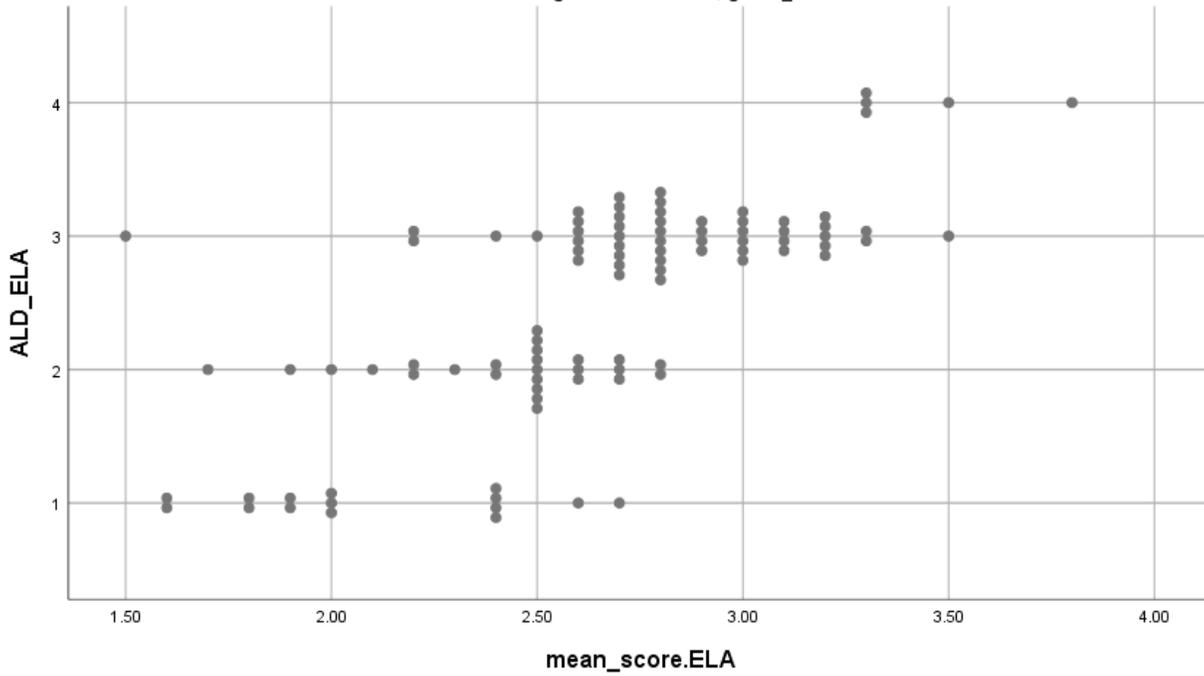
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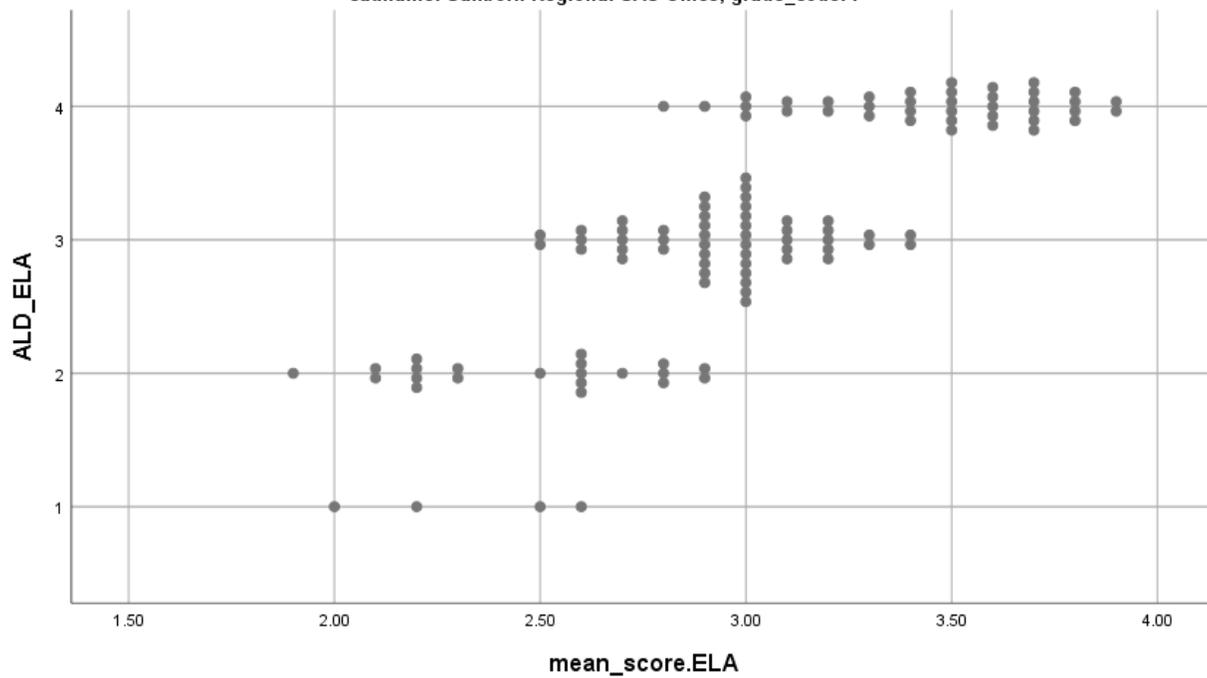
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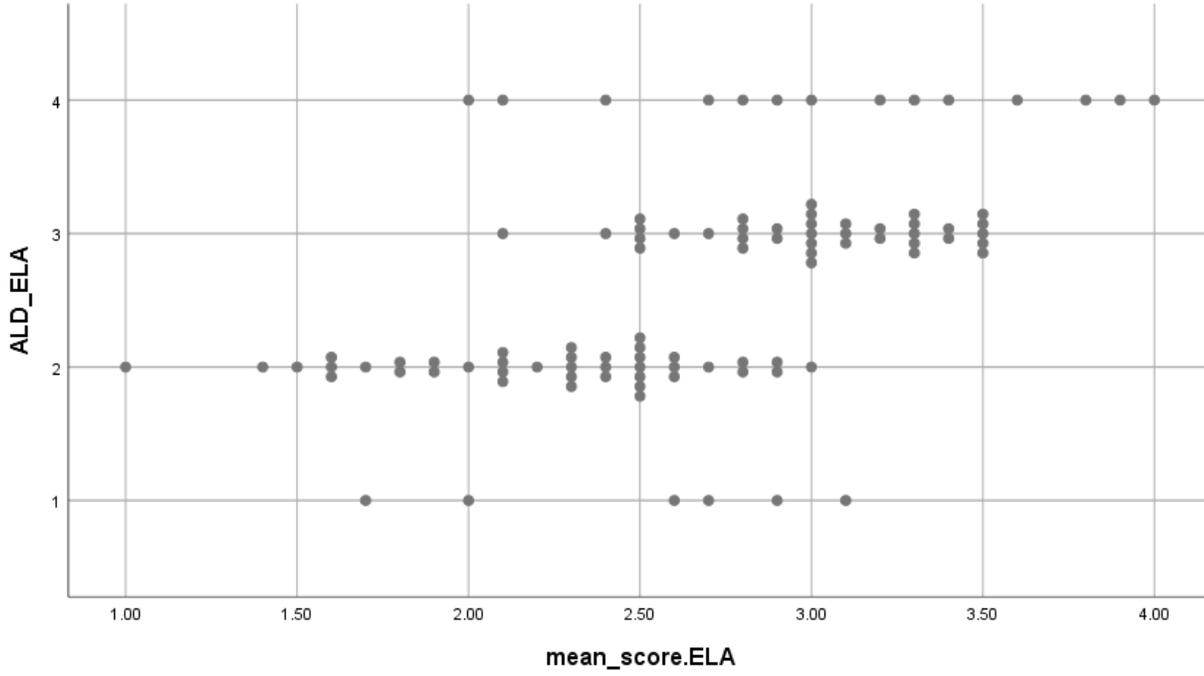
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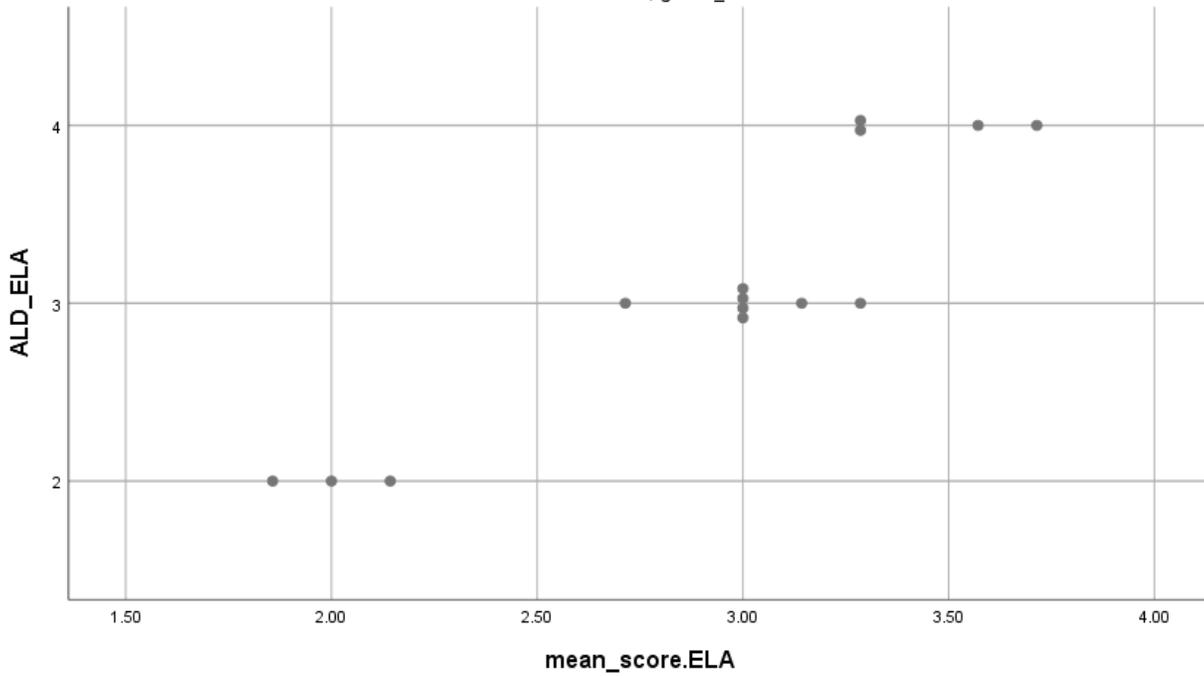
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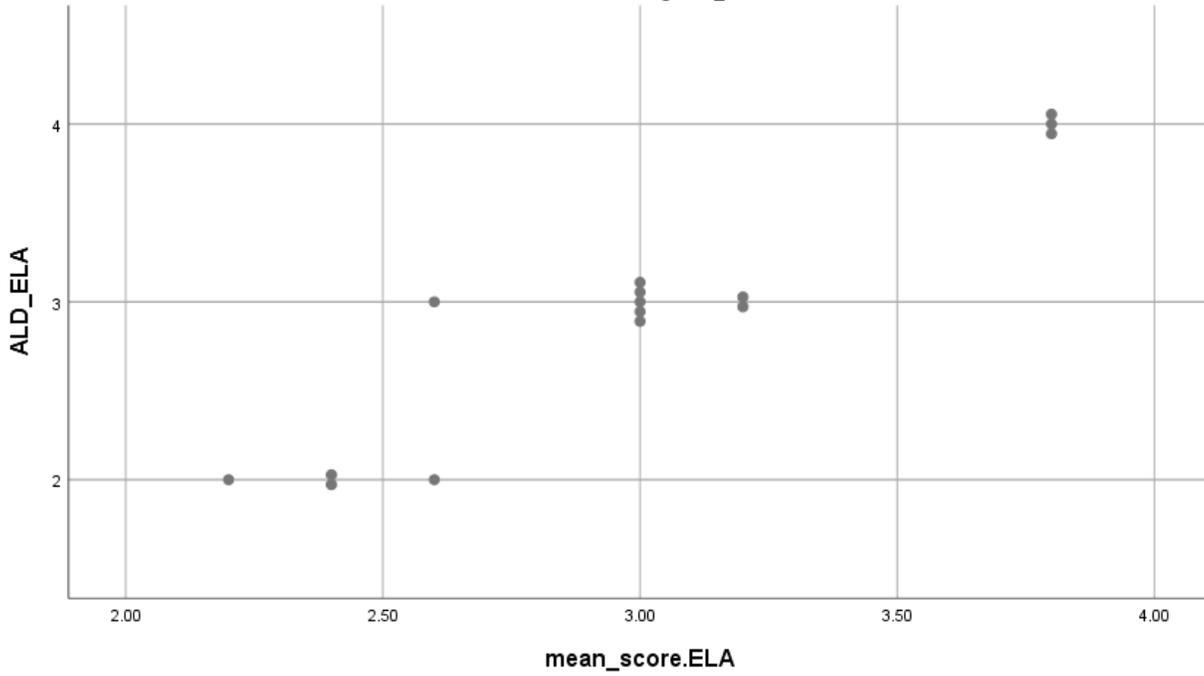
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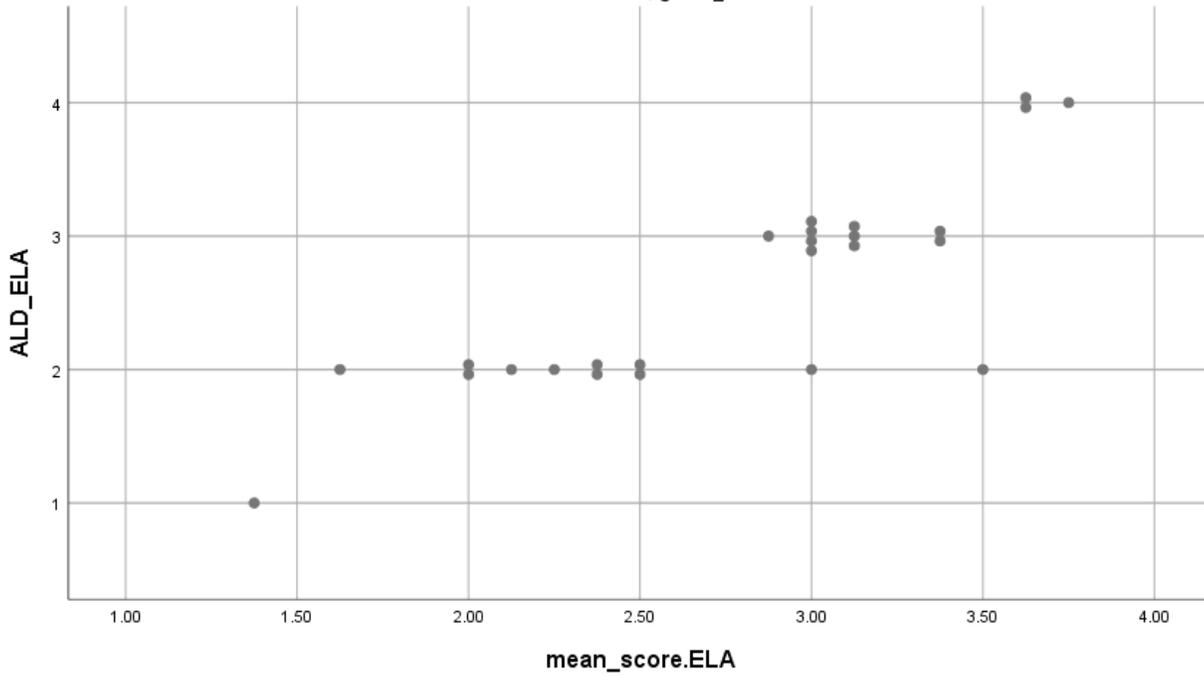
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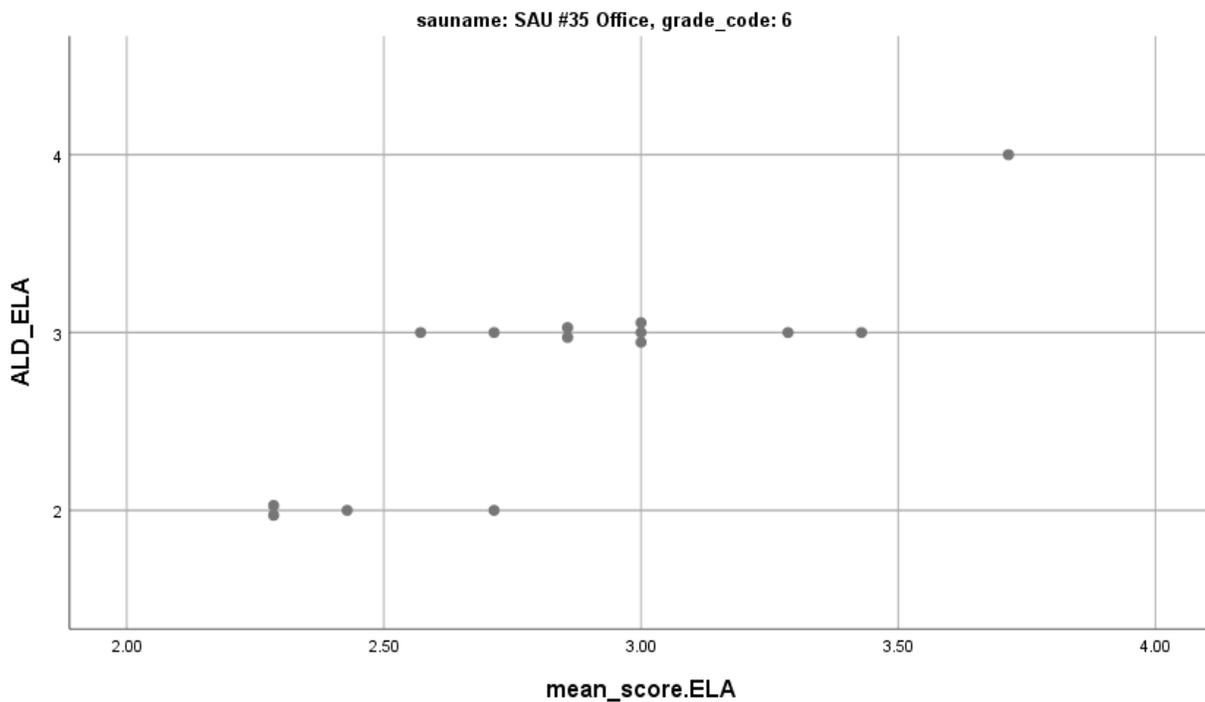


sauname: SAU #35 Office, grade_code: 4



sauname: SAU #35 Office, grade_code: 5





ELA Descriptives

Descriptive Statistics

sauname	grade_code		N	Minimum	Maximum	Mean	Std. Deviation
Amherst SAU Office	5	mean_score.ELA	154	1.76	3.64	2.8998	.33535
		ALD_ELA	145	1	4	2.88	.772
		Valid N (listwise)	145				
	6	mean_score.ELA	143	1.53	3.75	2.7401	.43097
		ALD_ELA	143	1	4	2.71	.688
		Valid N (listwise)	143				
	7	mean_score.ELA	160	1.76	3.75	2.8936	.36300
		ALD_ELA	157	1	4	2.91	.711
		Valid N (listwise)	157				
8	mean_score.ELA	177	1.66	3.84	2.9842	.42523	

		ALD_ELA	176	1	4	2.82	.734
		Valid N (listwise)	176				
Charter Schools	3	mean_score.ELA	31	1.00	3.80	2.5484	.72474
		ALD_ELA	32	1	4	2.22	.792
		Valid N (listwise)	31				
	4	mean_score.ELA	32	1.80	4.00	2.8063	.51678
		ALD_ELA	28	1	4	2.43	.790
		Valid N (listwise)	28				
	5	mean_score.ELA	34	1.50	3.67	2.6049	.45955
		ALD_ELA	31	1	3	2.23	.560
		Valid N (listwise)	30				
	6	mean_score.ELA	31	1.50	4.00	2.9409	.72207
		ALD_ELA	27	1	4	2.56	.892
		Valid N (listwise)	26				
	7	mean_score.ELA	33	1.00	3.20	2.5636	.57544
		ALD_ELA	26	2	3	2.73	.452
		Valid N (listwise)	26				
8	mean_score.ELA	35	1.40	3.40	2.5943	.50290	
	ALD_ELA	34	2	3	2.56	.504	
	Valid N (listwise)	34					
Concord SAU Office	3	mean_score.ELA	291	1.00	3.93	2.6547	.62583
		ALD_ELA	293	1	4	2.38	.816
		Valid N (listwise)	291				
	4	mean_score.ELA	299	1.00	4.00	2.7924	.59055
		ALD_ELA	308	1	4	2.55	.749
		Valid N (listwise)	298				

	5	mean_score.ELA	319	1.00	3.97	2.7530	.60014
		ALD_ELA	320	1	4	2.62	.787
		Valid N (listwise)	318				
	6	mean_score.ELA	324	1.00	4.00	2.7533	.63779
		ALD_ELA	322	1	4	2.61	.807
		Valid N (listwise)	322				
	7	mean_score.ELA	309	1.00	4.00	2.9396	.81090
		ALD_ELA	311	1	4	2.57	.917
		Valid N (listwise)	307				
8	mean_score.ELA	291	1.00	4.00	2.3809	.67719	
	ALD_ELA	293	1	4	2.43	.762	
	Valid N (listwise)	291					
Conway SAU Office	3	mean_score.ELA	39	1.20	3.80	2.8615	.56597
		ALD_ELA	39	1	4	2.87	.732
		Valid N (listwise)	39				
	4	mean_score.ELA	36	1.00	3.80	2.6833	.83683
		ALD_ELA	36	1	4	2.56	.735
		Valid N (listwise)	36				
	5	mean_score.ELA	41	1.80	3.80	2.6829	.57092
		ALD_ELA	41	1	4	2.24	.860
		Valid N (listwise)	41				
6	mean_score.ELA	42	1.75	3.75	2.7917	.53510	
	ALD_ELA	42	1	4	2.55	.705	
	Valid N (listwise)	42					
Epping SAU Office	3	mean_score.ELA	77	1.00	4.00	2.6994	.76921
		ALD_ELA	77	1	4	2.73	.821

	Valid N (listwise)	77					
4	mean_score.ELA	68	1.00	3.95	2.7363	.60788	
	ALD_ELA	68	1	4	2.65	.686	
	Valid N (listwise)	68					
5	mean_score.ELA	63	1.00	3.20	2.2484	.66198	
	ALD_ELA	63	1	3	2.06	.759	
	Valid N (listwise)	63					
6	mean_score.ELA	75	1.00	4.00	2.6380	.76068	
	ALD_ELA	75	1	4	2.45	.759	
	Valid N (listwise)	75					
7	mean_score.ELA	66	1.00	4.00	2.4962	.72819	
	ALD_ELA	66	1	4	2.38	.760	
	Valid N (listwise)	66					
8	mean_score.ELA	68	1.00	3.05	2.5449	.57550	
	ALD_ELA	68	1	4	2.63	.710	
	Valid N (listwise)	68					
Haverhill Cooperative SAU Office	3	mean_score.ELA	148	1.00	4.00	2.7618	.65113
		ALD_ELA	73	1	4	2.60	.862
		Valid N (listwise)	73				
	4	mean_score.ELA	72	1.00	3.75	2.4965	.67363
		ALD_ELA	73	1	4	2.60	.893
		Valid N (listwise)	72				
	5	mean_score.ELA	51	1.25	3.50	2.4632	.54846
		ALD_ELA	51	1	4	2.49	.784
		Valid N (listwise)	51				
	6	mean_score.ELA	87	1.00	4.00	2.7046	.66700

		ALD_ELA	88	1	4	2.62	.748
		Valid N (listwise)	87				
	7	mean_score.ELA	68	1.63	3.88	2.7647	.58172
		ALD_ELA	73	1	4	2.62	.700
		Valid N (listwise)	68				
	8	mean_score.ELA	198	1.00	4.00	2.6477	.64747
		ALD_ELA	67	1	4	2.48	.766
		Valid N (listwise)	66				
Laconia SAU Office	3	mean_score.ELA	149	1.00	3.50	2.4762	.59175
		ALD_ELA	148	1	4	2.40	.855
		Valid N (listwise)	148				
	4	mean_score.ELA	147	1.00	3.50	2.2823	.57934
		ALD_ELA	146	1	3	2.18	.692
		Valid N (listwise)	146				
	5	mean_score.ELA	160	1.00	4.00	2.4047	.58939
		ALD_ELA	160	1	4	2.44	.652
		Valid N (listwise)	160				
Monroe SAU Office	3	mean_score.ELA	11	2.00	3.00	2.8182	.40452
		ALD_ELA	11	2	4	2.73	.786
		Valid N (listwise)	11				
	4	mean_score.ELA	5	2.00	3.00	2.8000	.44721
		ALD_ELA	4	2	3	2.50	.577
		Valid N (listwise)	4				
	5	mean_score.ELA	6	2.00	4.00	3.0000	.63246
		ALD_ELA	6	2	3	2.50	.548
		Valid N (listwise)	6				

	6	mean_score.ELA	6	2.00	4.00	3.0000	.63246
		ALD_ELA	6	2	4	3.00	.632
		Valid N (listwise)	6				
	7	mean_score.ELA	8	1.00	3.00	2.5625	.72887
		ALD_ELA	8	1	4	2.13	1.126
		Valid N (listwise)	8				
	8	mean_score.ELA	12	2.00	4.00	2.7500	.62158
		ALD_ELA	12	1	4	3.08	1.084
		Valid N (listwise)	12				
Newport SAU Office	3	mean_score.ELA	68	1.00	5.88	2.4060	1.00963
		ALD_ELA	64	1	4	2.26	1.004
		Valid N (listwise)	64				
	4	mean_score.ELA	70	1.00	3.14	2.3856	.54510
		ALD_ELA	66	1	4	2.26	.771
		Valid N (listwise)	66				
	5	mean_score.ELA	91	1.00	3.67	2.4222	.65442
		ALD_ELA	88	1	4	2.18	.838
		Valid N (listwise)	88				
	6	mean_score.ELA	65	1.64	3.69	2.8686	.39735
		ALD_ELA	63	1	4	2.44	.757
		Valid N (listwise)	62				
	7	mean_score.ELA	69	1.00	3.50	2.1133	.58467
		ALD_ELA	66	1	4	2.26	.751
		Valid N (listwise)	66				
	8	mean_score.ELA	72	1.00	3.57	2.2443	.76044
		ALD_ELA	76	1	3	1.79	.805

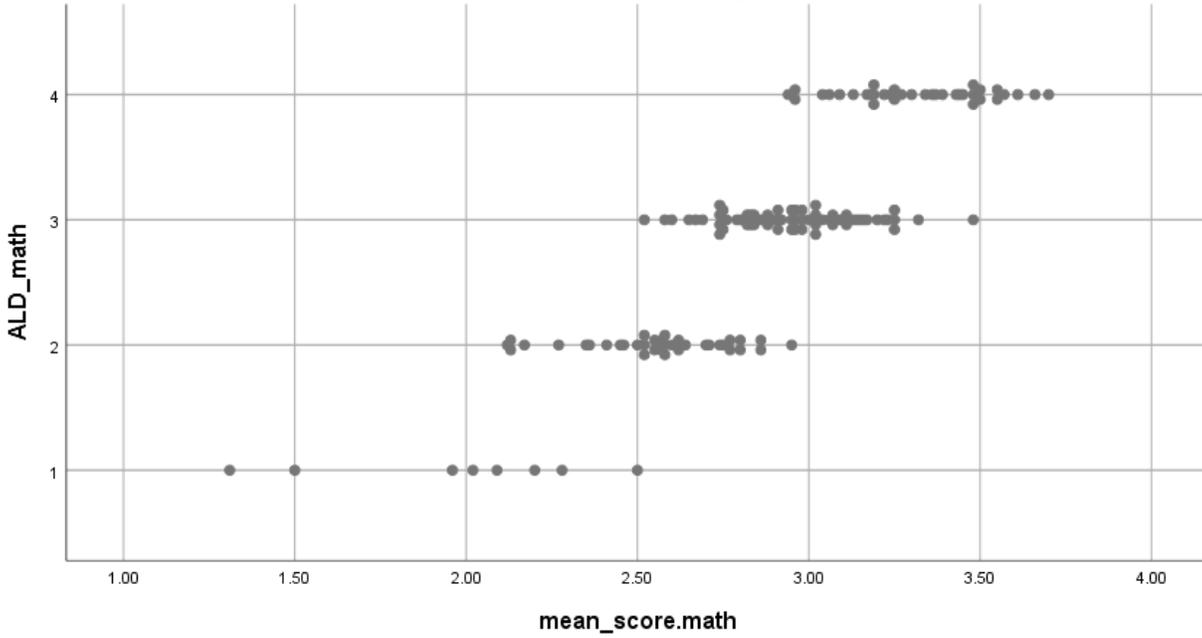
		Valid N (listwise)	72				
Rochester SAU Office	3	mean_score.ELA	277	1.43	4.00	2.9339	.47864
		ALD_ELA	270	1	4	2.59	.856
		Valid N (listwise)	270				
	4	mean_score.ELA	331	1.29	4.00	3.2595	.52718
		ALD_ELA	301	1	4	2.70	.806
		Valid N (listwise)	301				
	5	mean_score.ELA	287	1.00	4.00	3.2294	.54610
		ALD_ELA	284	1	4	2.63	.897
		Valid N (listwise)	284				
	6	mean_score.ELA	305	1.00	4.00	3.4590	.57779
		ALD_ELA	299	1	4	2.52	.910
		Valid N (listwise)	295				
	7	mean_score.ELA	324	1.00	4.00	3.3684	.53176
		ALD_ELA	314	1	4	2.31	.855
		Valid N (listwise)	311				
8	mean_score.ELA	283	1.00	4.00	3.0396	.93345	
	ALD_ELA	280	1	4	2.29	.956	
	Valid N (listwise)	276					
Sanborn Regional SAU Office	3	mean_score.ELA	75	1.50	3.90	2.9680	.35647
		ALD_ELA	74	2	4	2.76	.637
		Valid N (listwise)	74				
	4	mean_score.ELA	107	2.30	3.30	2.7925	.24017
		ALD_ELA	107	1	4	2.40	.725
		Valid N (listwise)	107				
	5	mean_score.ELA	103	1.90	3.70	2.8379	.39086

		ALD_ELA	103	1	4	2.59	.678
		Valid N (listwise)	103				
6		mean_score.ELA	98	1.50	3.80	2.6398	.45014
		ALD_ELA	98	1	4	2.48	.815
		Valid N (listwise)	98				
7		mean_score.ELA	115	1.90	3.90	3.0157	.45453
		ALD_ELA	115	1	4	3.09	.812
		Valid N (listwise)	115				
8		mean_score.ELA	99	1.00	4.00	2.6657	.59370
		ALD_ELA	99	1	4	2.61	.806
		Valid N (listwise)	99				
SAU #35 Office	3	mean_score.ELA	14	1.86	3.71	2.9286	.56521
		ALD_ELA	14	2	4	3.07	.730
		Valid N (listwise)	14				
	4	mean_score.ELA	15	2.20	3.80	3.0000	.51270
		ALD_ELA	15	2	4	2.93	.704
		Valid N (listwise)	15				
	5	mean_score.ELA	25	1.38	3.75	2.7850	.64299
		ALD_ELA	25	1	4	2.60	.764
		Valid N (listwise)	25				
	6	mean_score.ELA	14	2.29	3.71	2.8673	.41730
		ALD_ELA	15	2	4	2.73	.594
		Valid N (listwise)	14				

Math Scatterplots

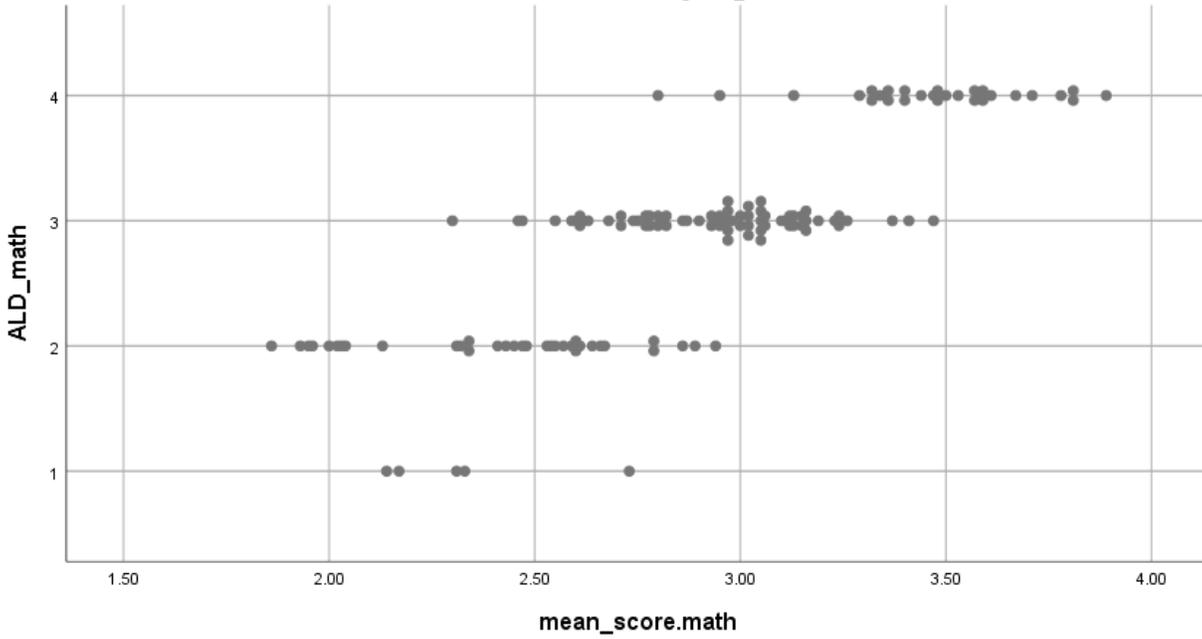
Simple Scatter of ALD_math by mean_score.math

sauname: Amherst SAU Office, grade_code: 5



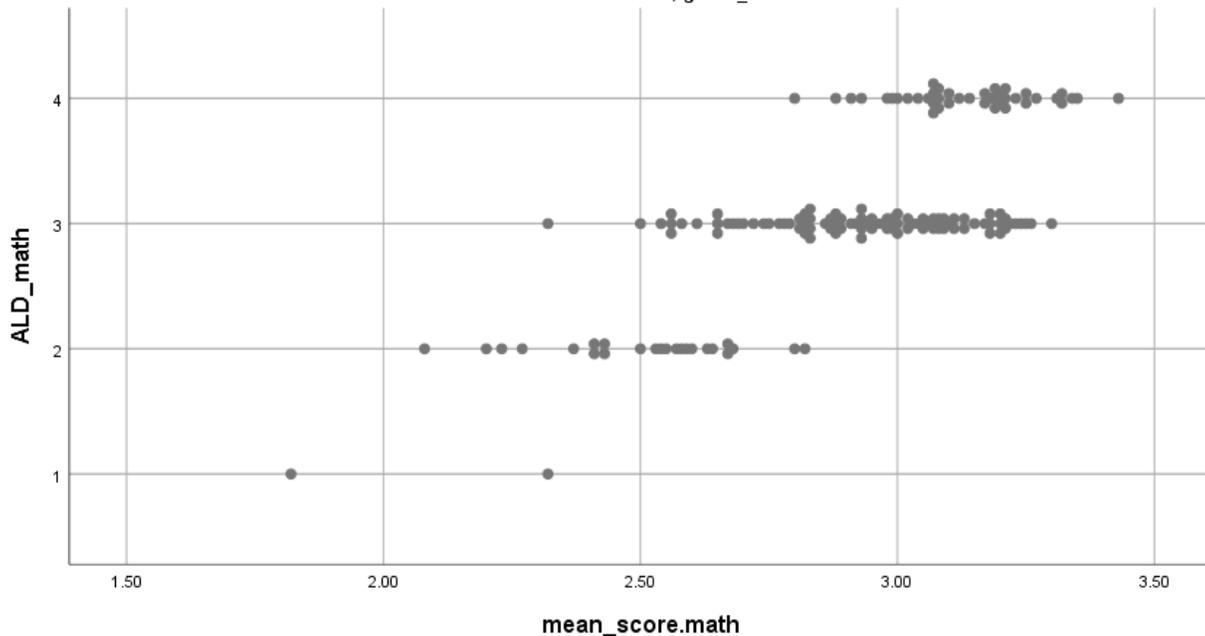
Simple Scatter of ALD_math by mean_score.math

sauname: Amherst SAU Office, grade_code: 6



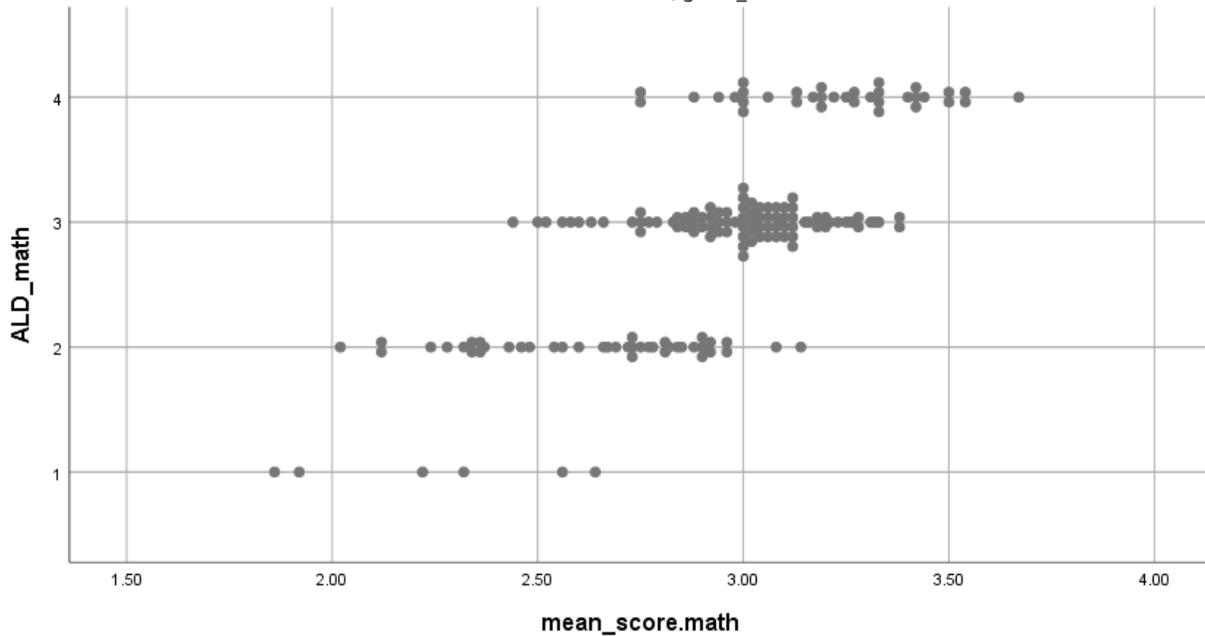
Simple Scatter of ALD_math by mean_score.math

sauname: Amherst SAU Office, grade_code: 7



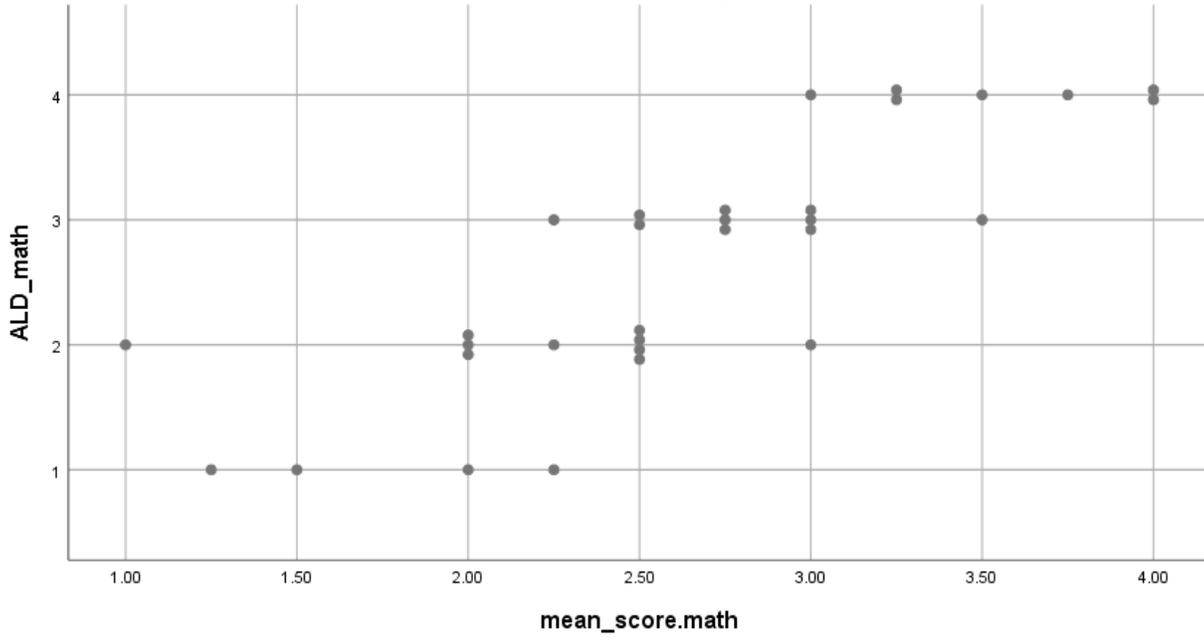
Simple Scatter of ALD_math by mean_score.math

sauname: Amherst SAU Office, grade_code: 8



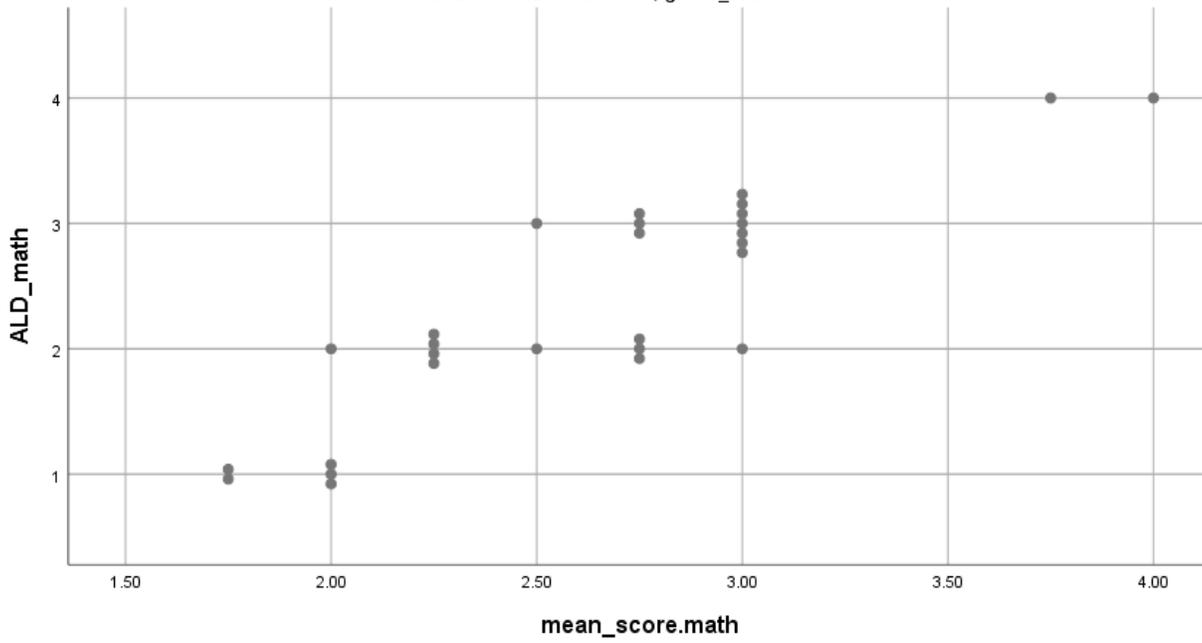
Simple Scatter of ALD_math by mean_score.math

sauname: Charter Schools, grade_code: 3



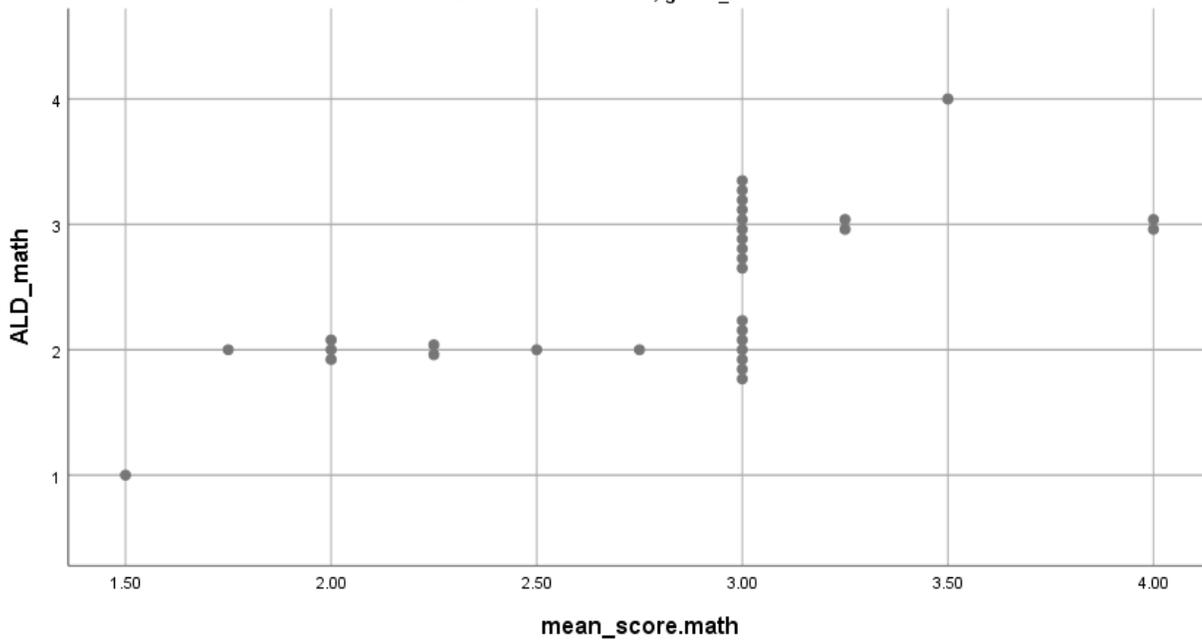
Simple Scatter of ALD_math by mean_score.math

sauname: Charter Schools, grade_code: 4



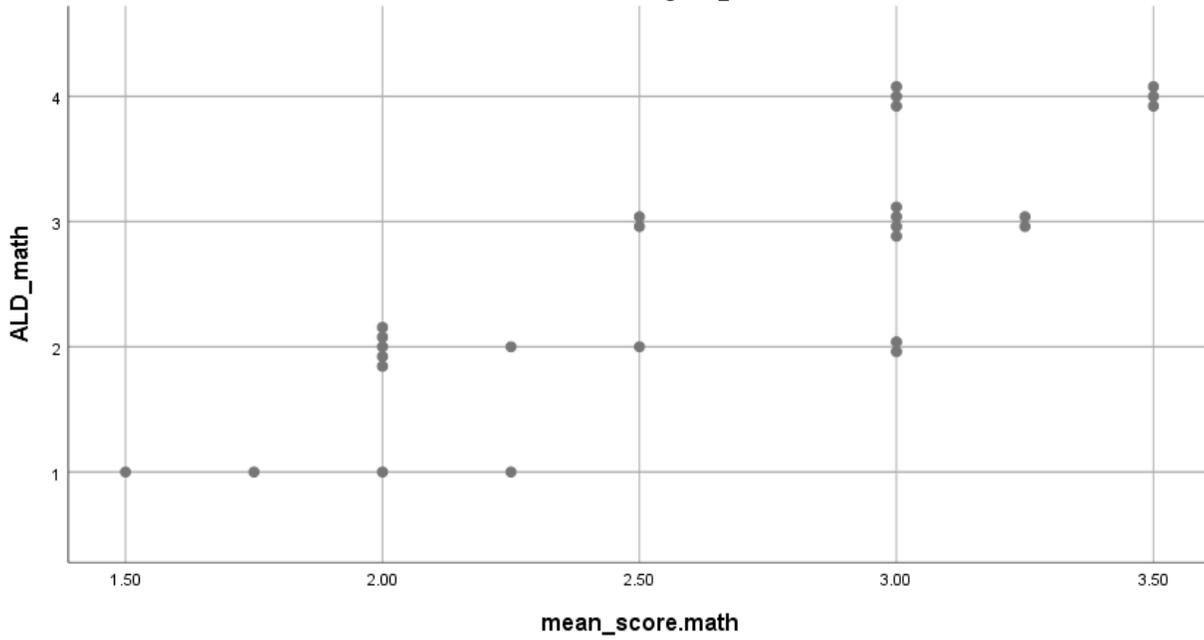
Simple Scatter of ALD_math by mean_score.math

sauname: Charter Schools, grade_code: 5



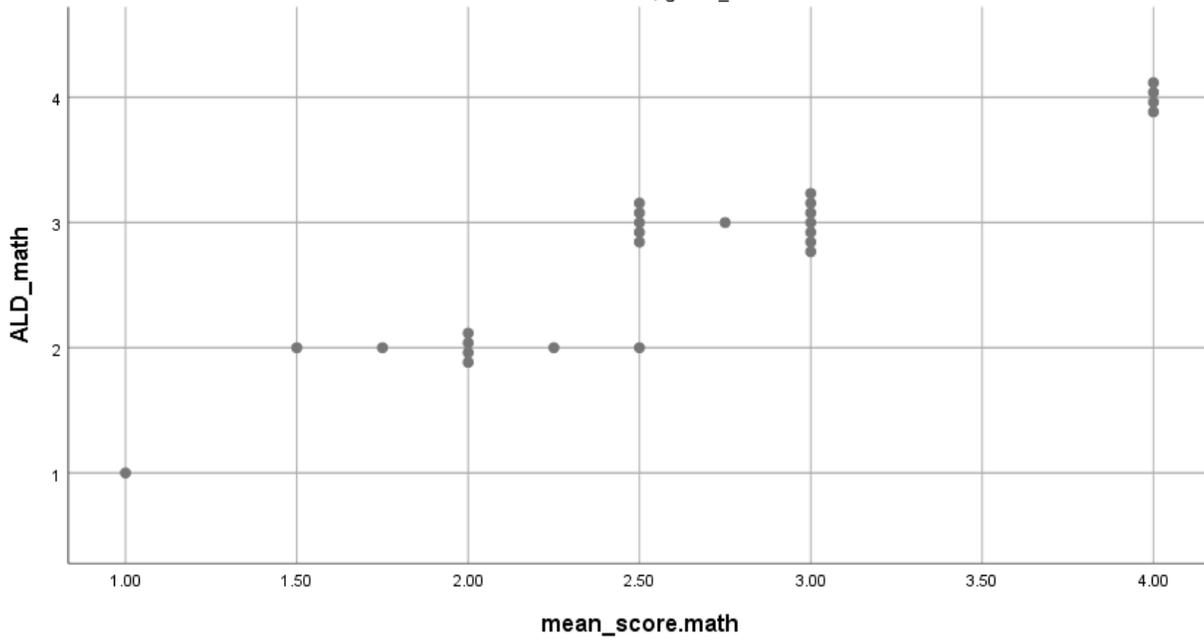
Simple Scatter of ALD_math by mean_score.math

sauname: Charter Schools, grade_code: 6



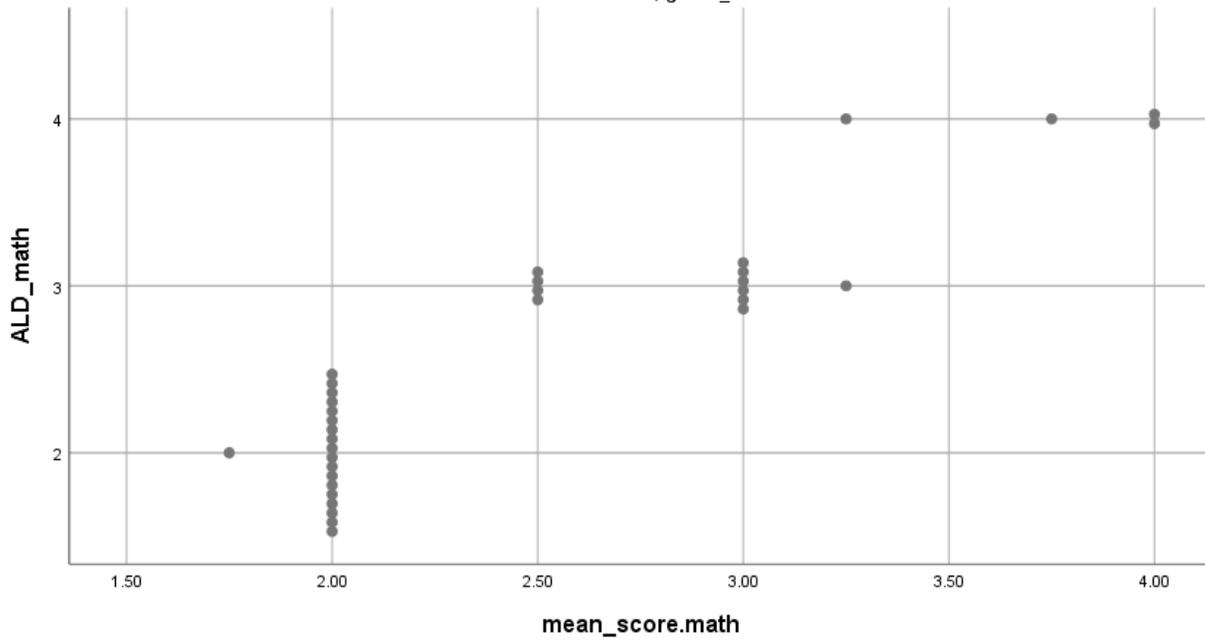
Simple Scatter of ALD_math by mean_score.math

sauname: Charter Schools, grade_code: 7



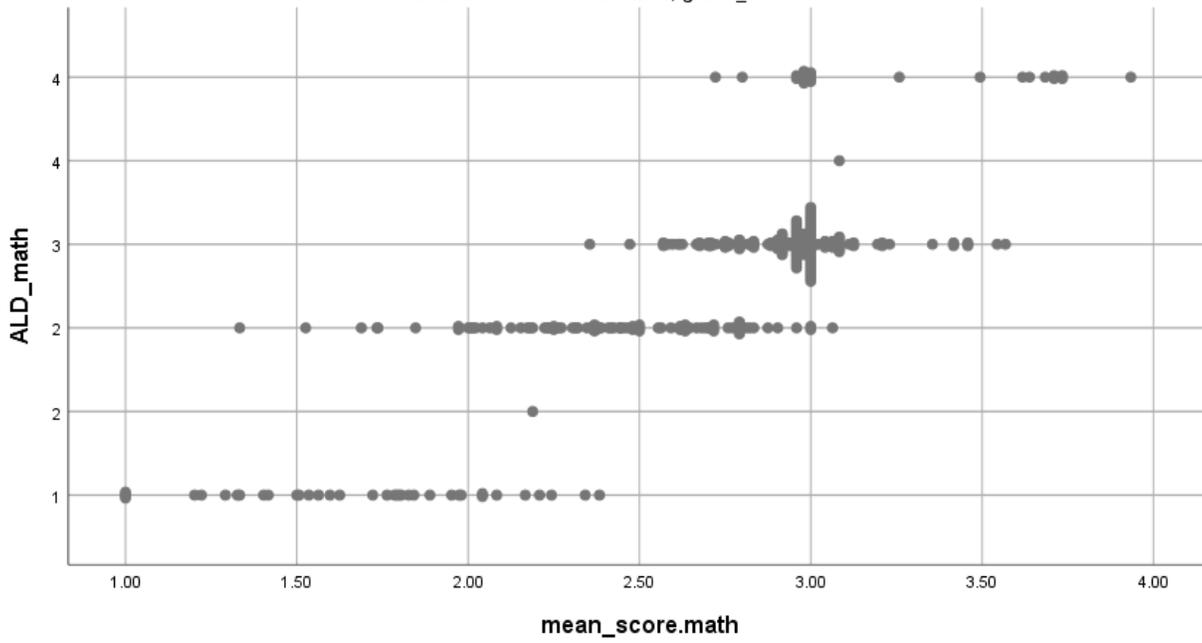
Simple Scatter of ALD_math by mean_score.math

sauname: Charter Schools, grade_code: 8



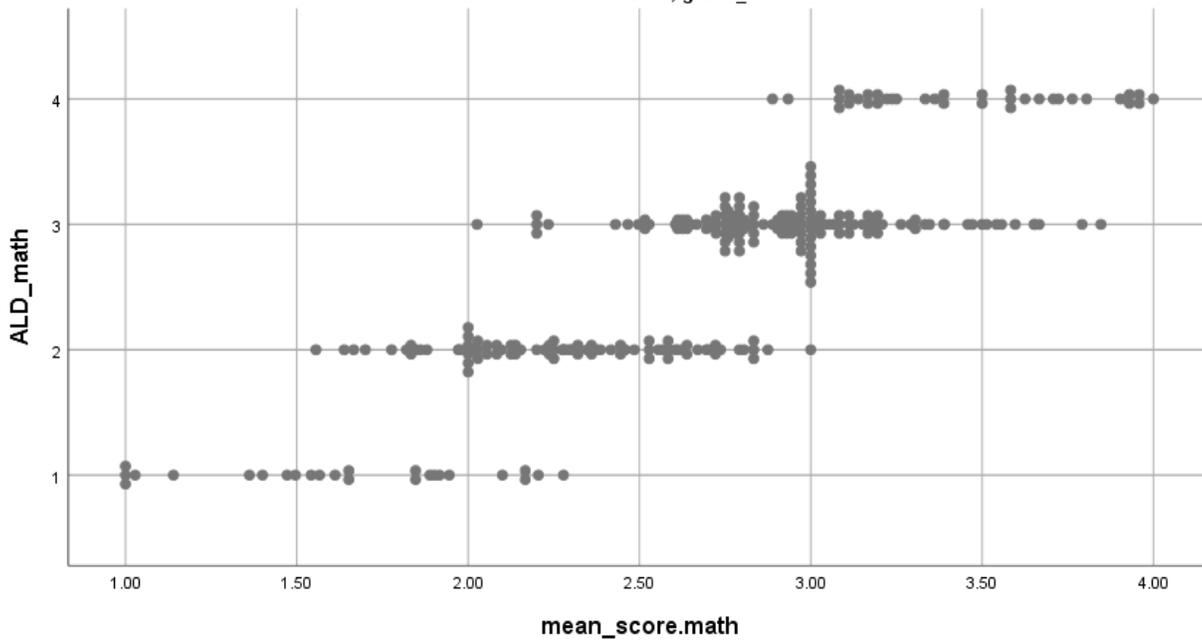
Simple Scatter of ALD_math by mean_score.math

sauname: Concord SAU Office, grade_code: 3



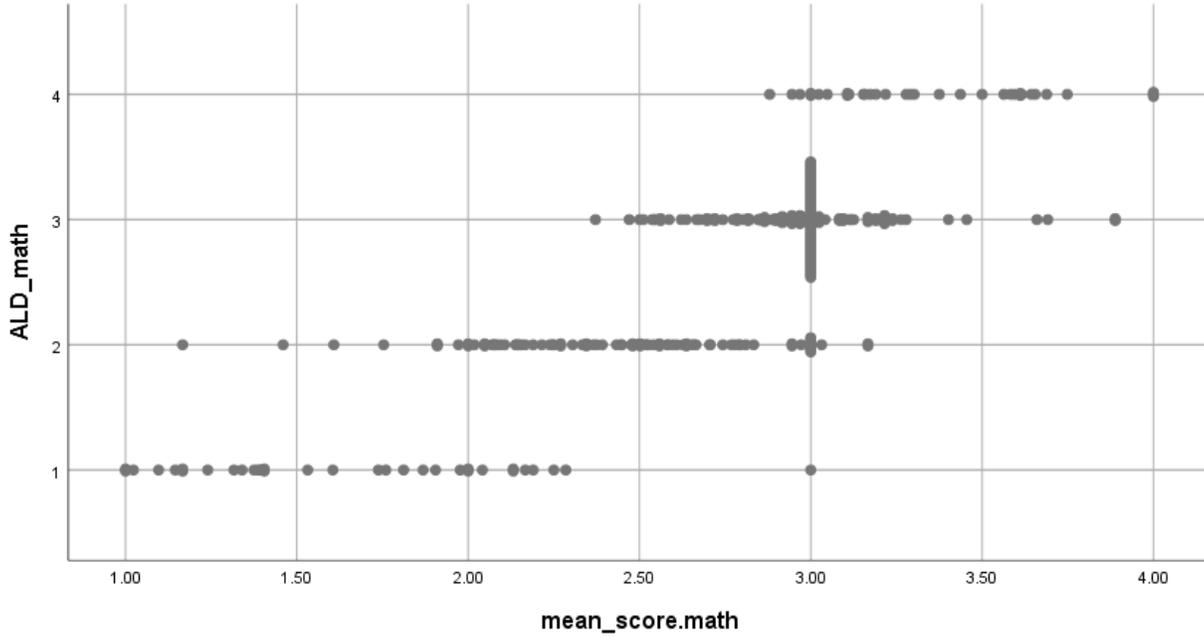
Simple Scatter of ALD_math by mean_score.math

sauname: Concord SAU Office, grade_code: 4



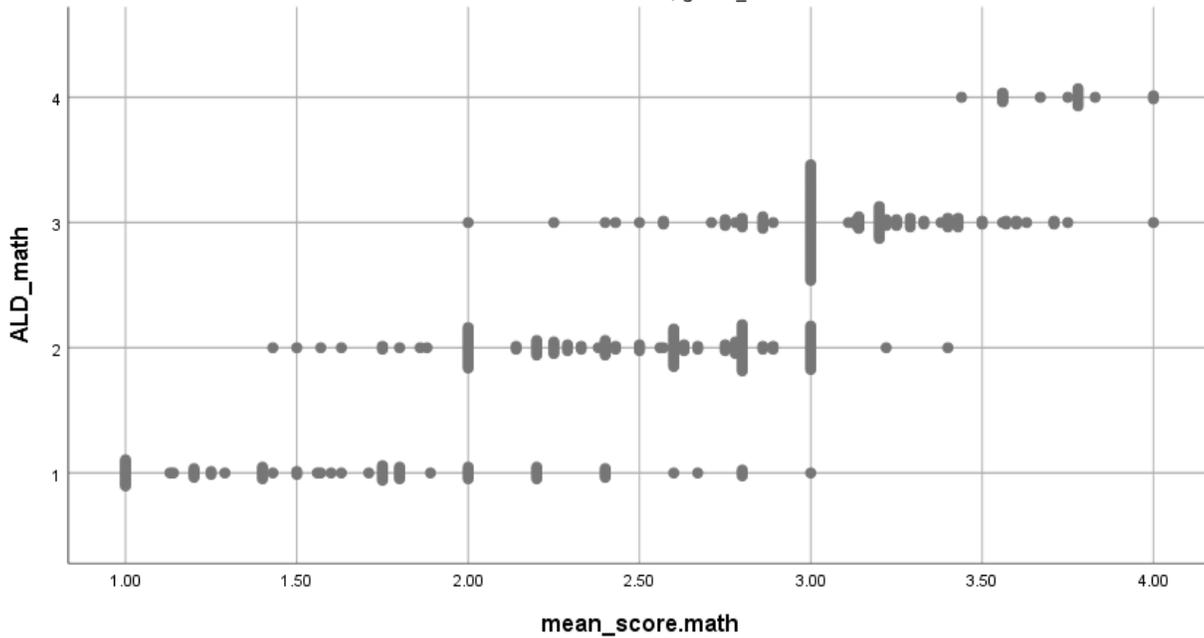
Simple Scatter of ALD_math by mean_score.math

sauname: Concord SAU Office, grade_code: 5



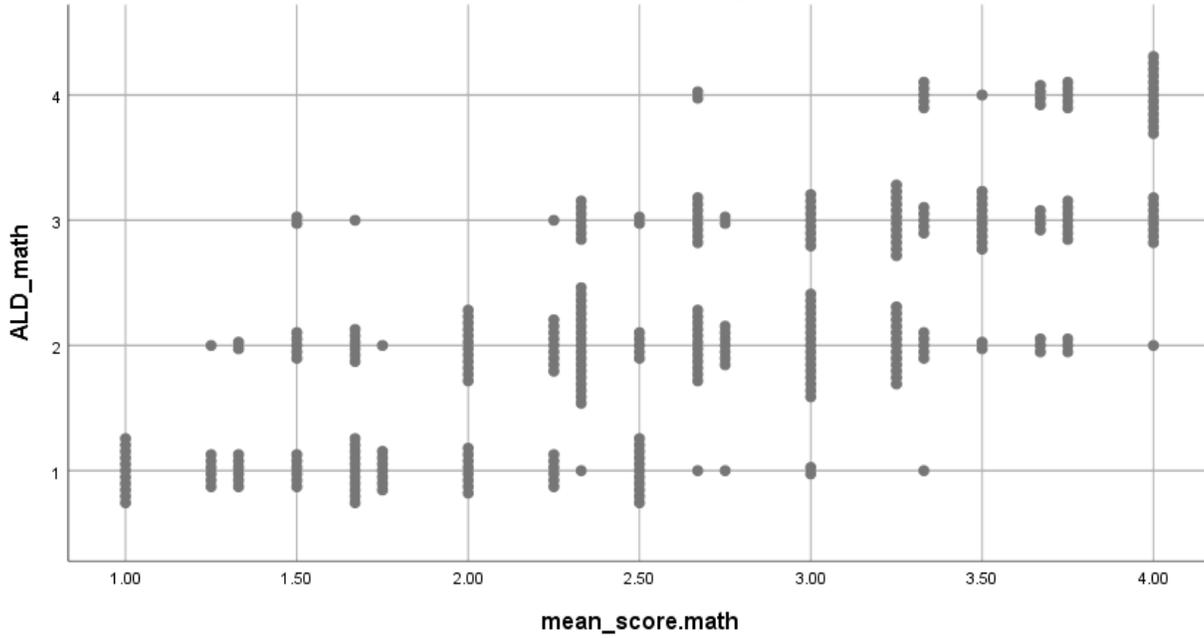
Simple Scatter of ALD_math by mean_score.math

sauname: Concord SAU Office, grade_code: 6



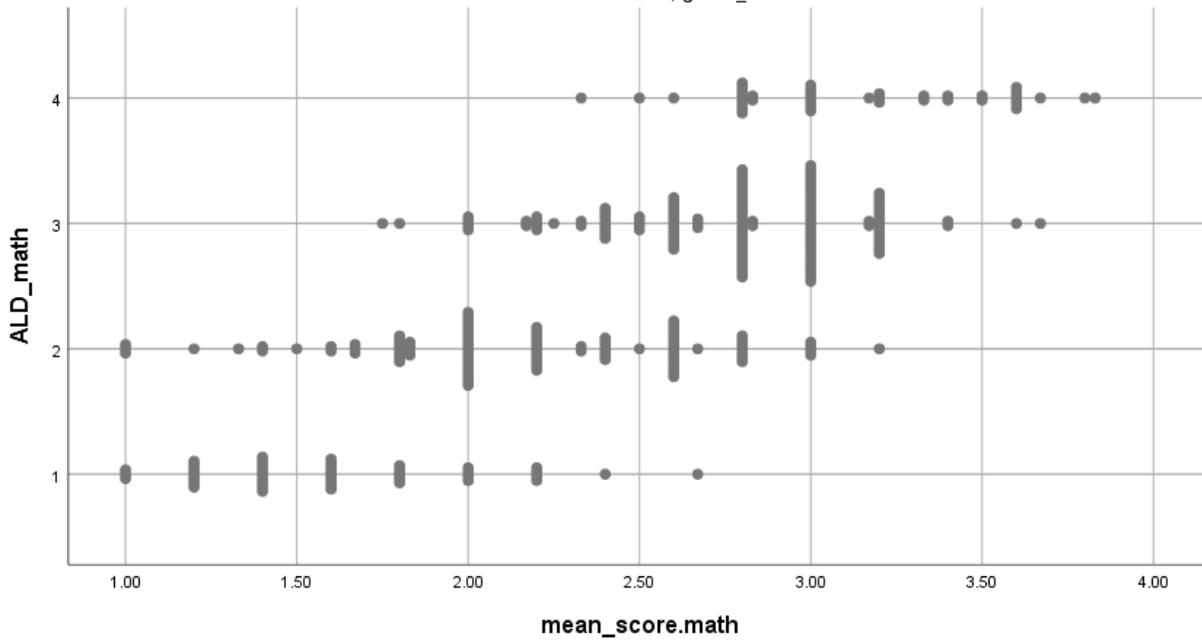
Simple Scatter of ALD_math by mean_score.math

sauname: Concord SAU Office, grade_code: 7



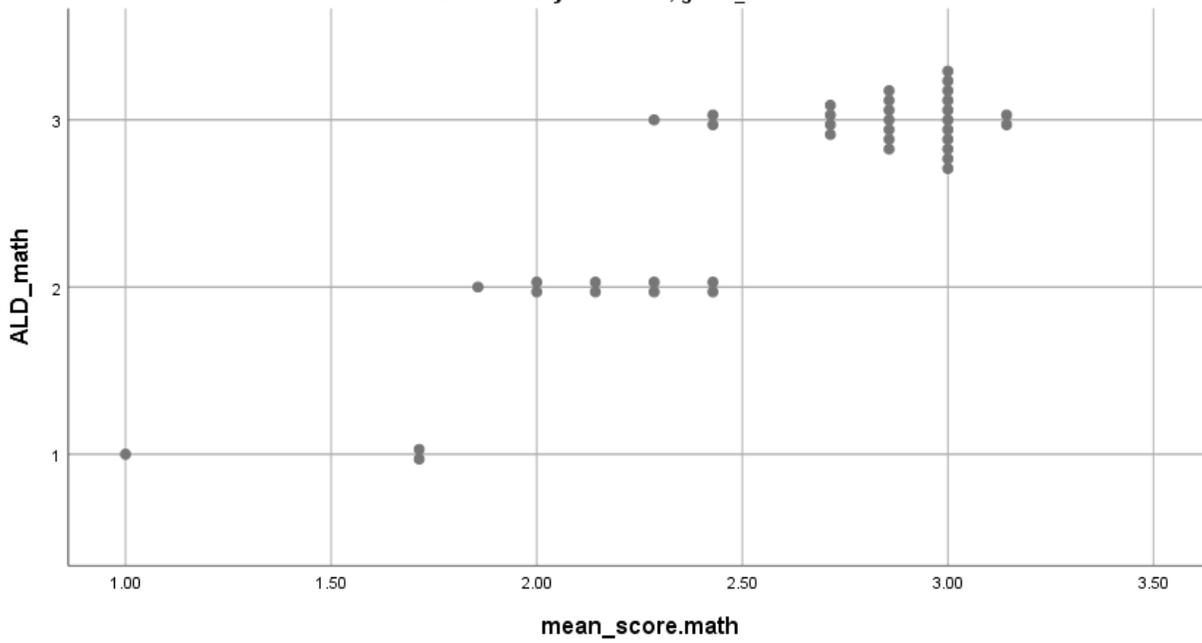
Simple Scatter of ALD_math by mean_score.math

sauname: Concord SAU Office, grade_code: 8



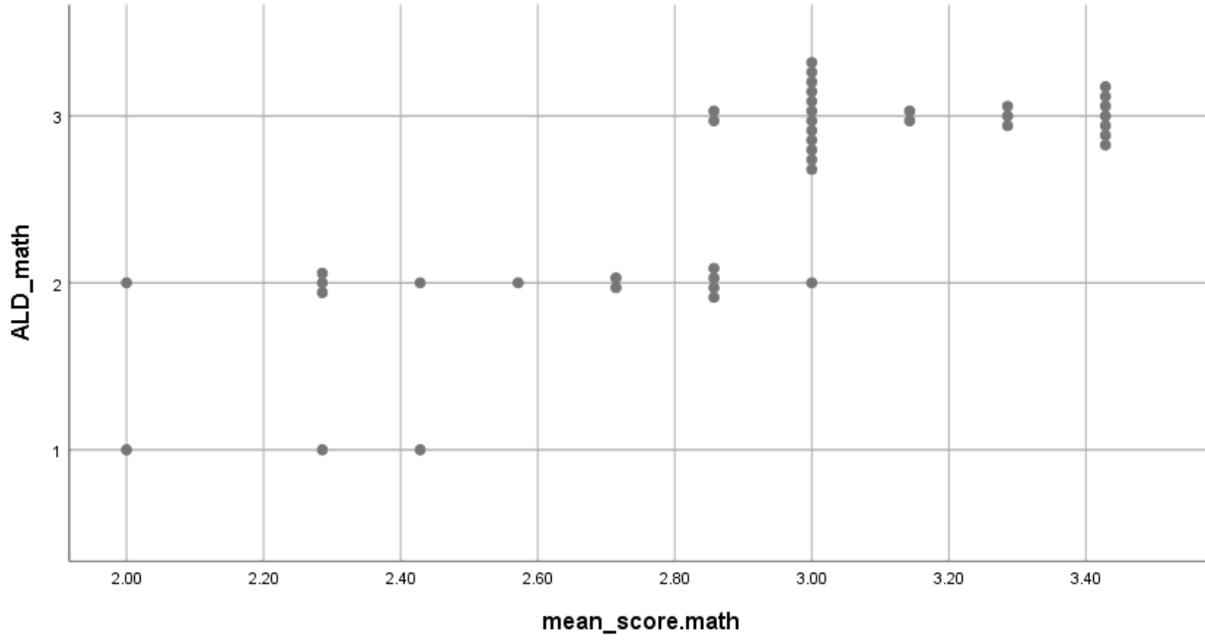
Simple Scatter of ALD_math by mean_score.math

sauname: Conway SAU Office, grade_code: 3



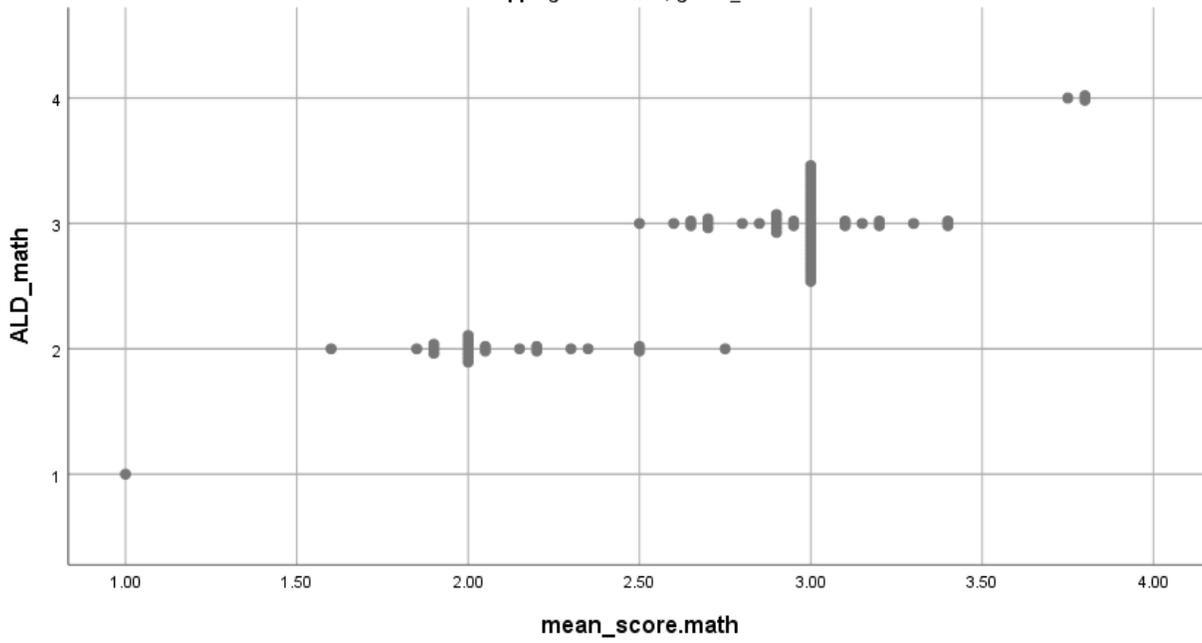
Simple Scatter of ALD_math by mean_score.math

sauname: Conway SAU Office, grade_code: 6



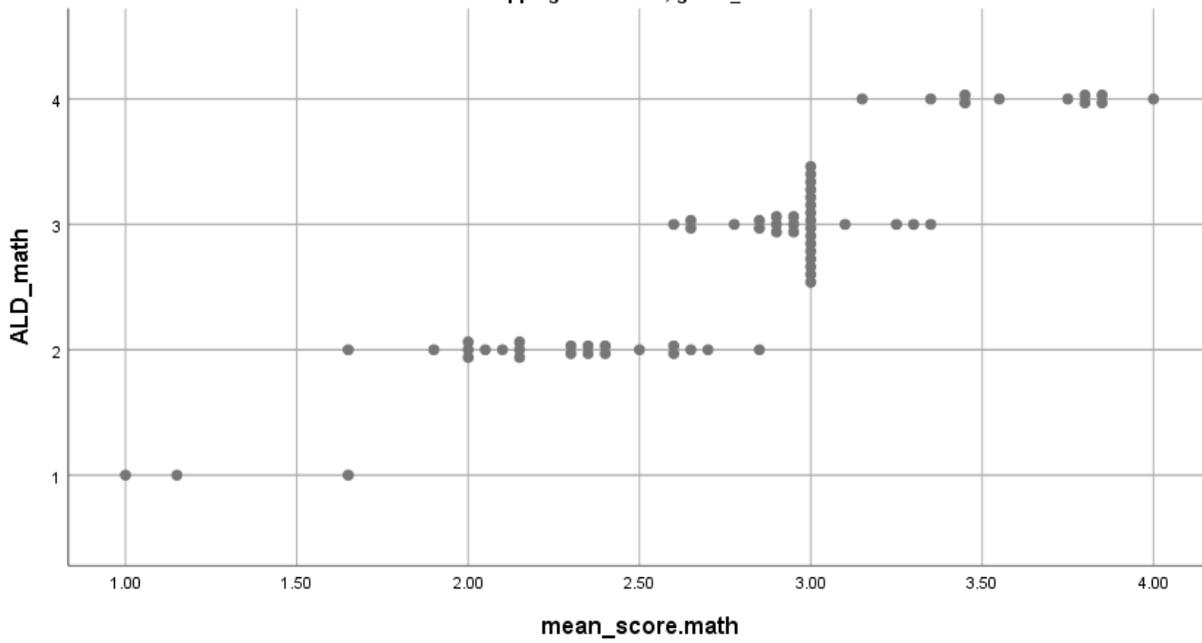
Simple Scatter of ALD_math by mean_score.math

sauname: Epping SAU Office, grade_code: 3



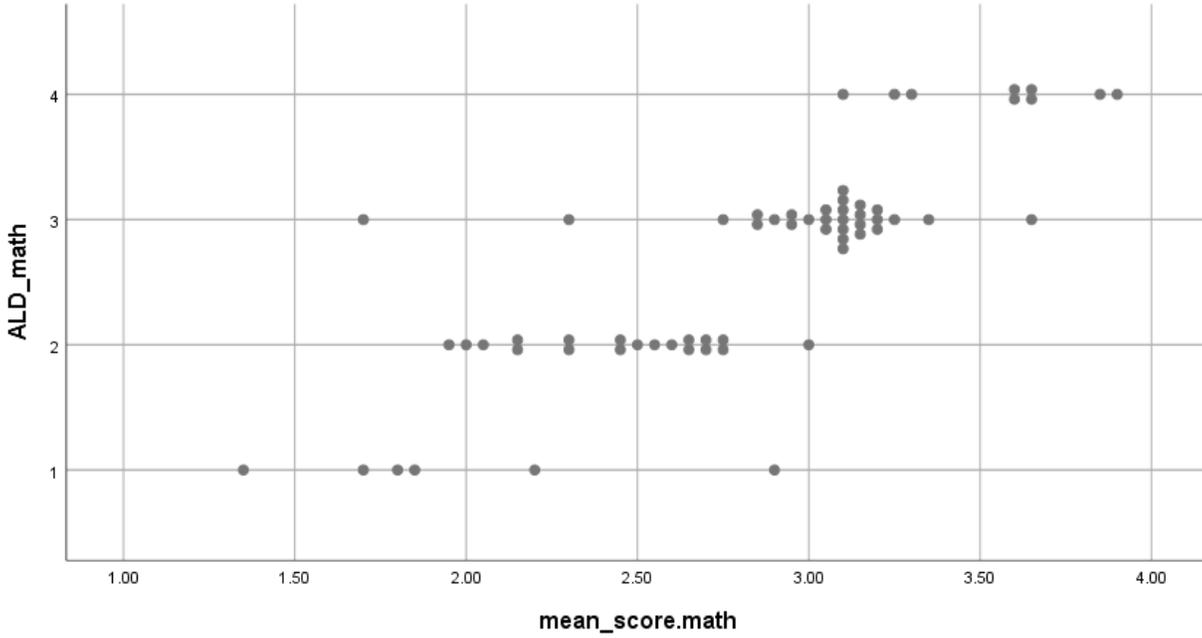
Simple Scatter of ALD_math by mean_score.math

sauname: Epping SAU Office, grade_code: 4



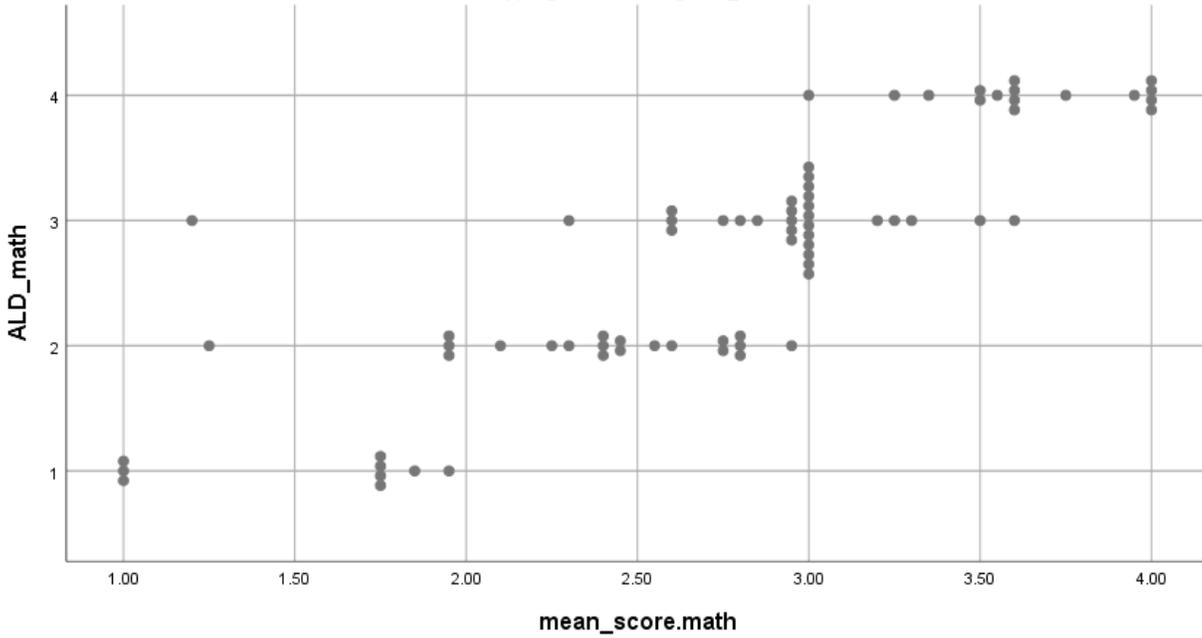
Simple Scatter of ALD_math by mean_score.math

sauname: Epping SAU Office, grade_code: 5



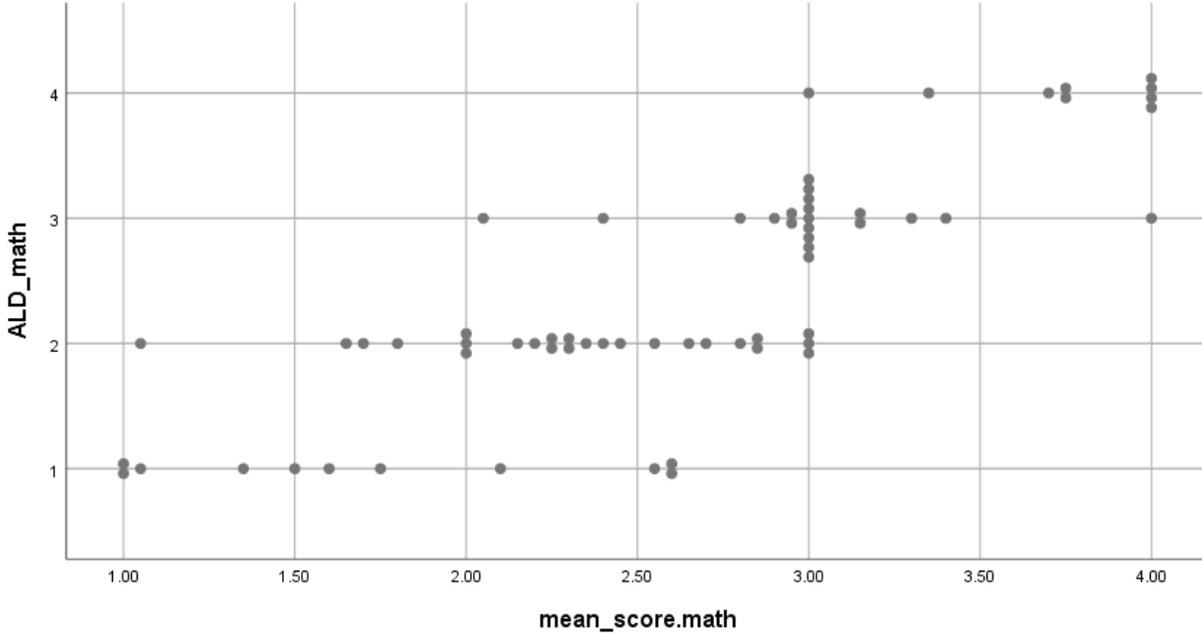
Simple Scatter of ALD_math by mean_score.math

sauname: Epping SAU Office, grade_code: 6



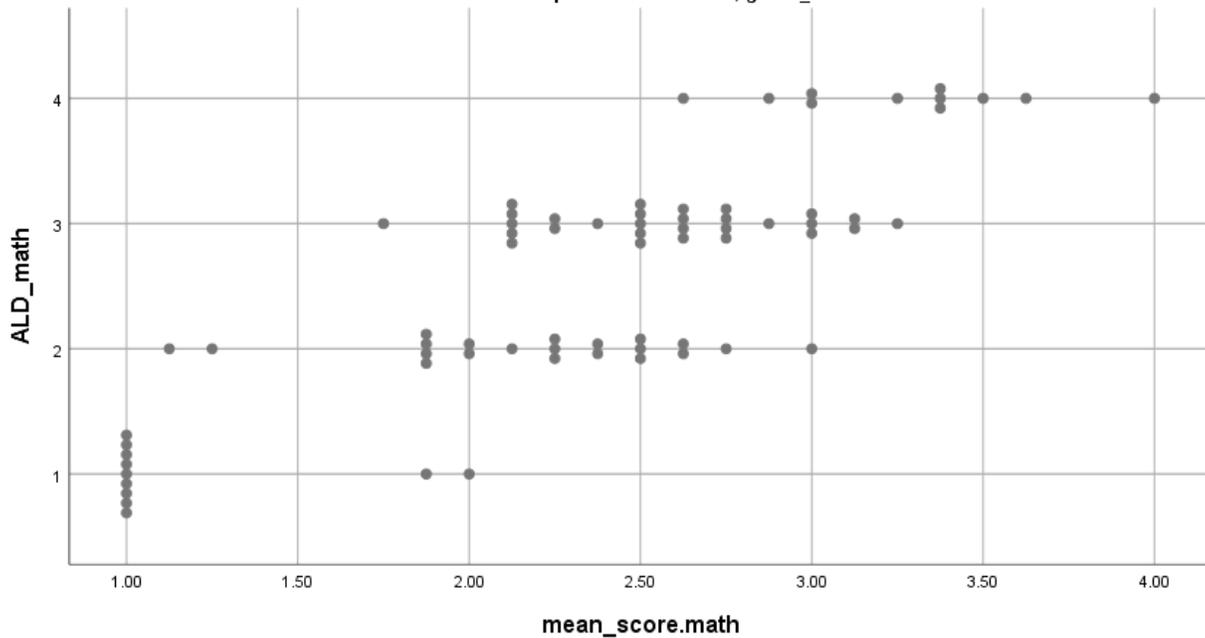
Simple Scatter of ALD_math by mean_score.math

sauname: Epping SAU Office, grade_code: 7



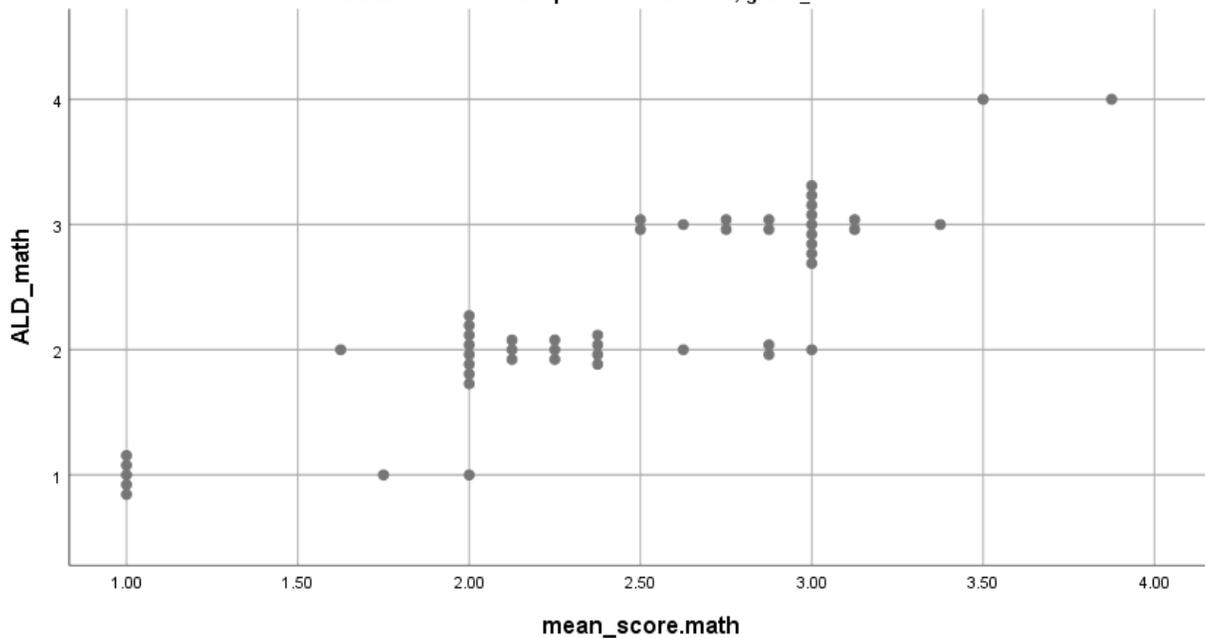
Simple Scatter of ALD_math by mean_score.math

sauname: Haverhill Cooperative SAU Office, grade_code: 4



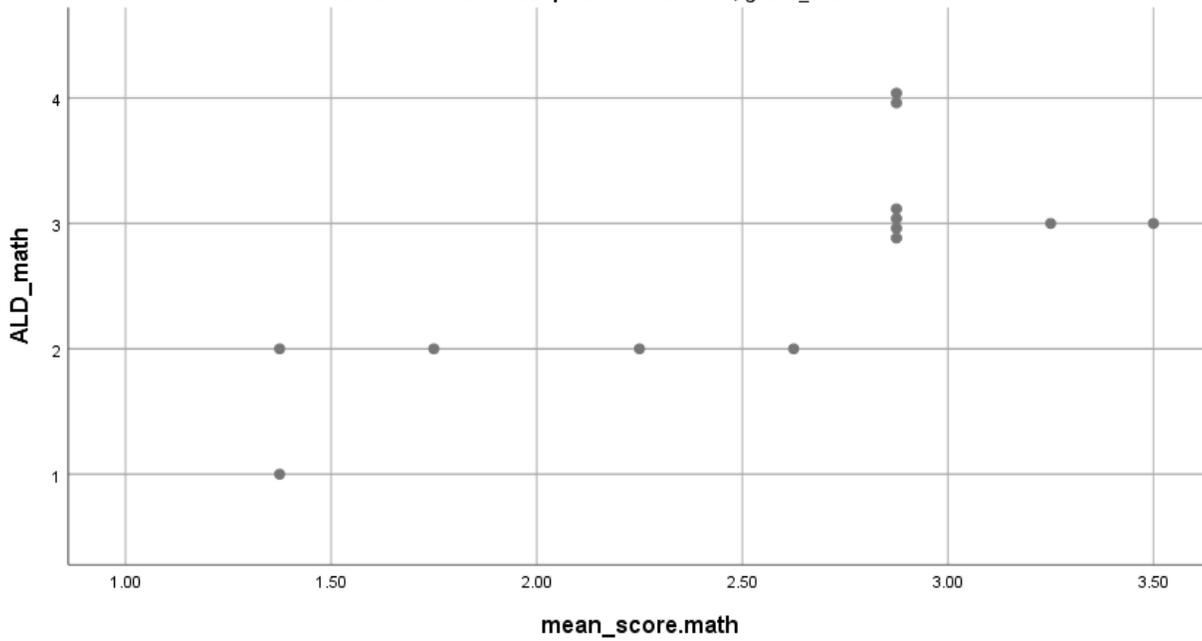
Simple Scatter of ALD_math by mean_score.math

sauname: Haverhill Cooperative SAU Office, grade_code: 5



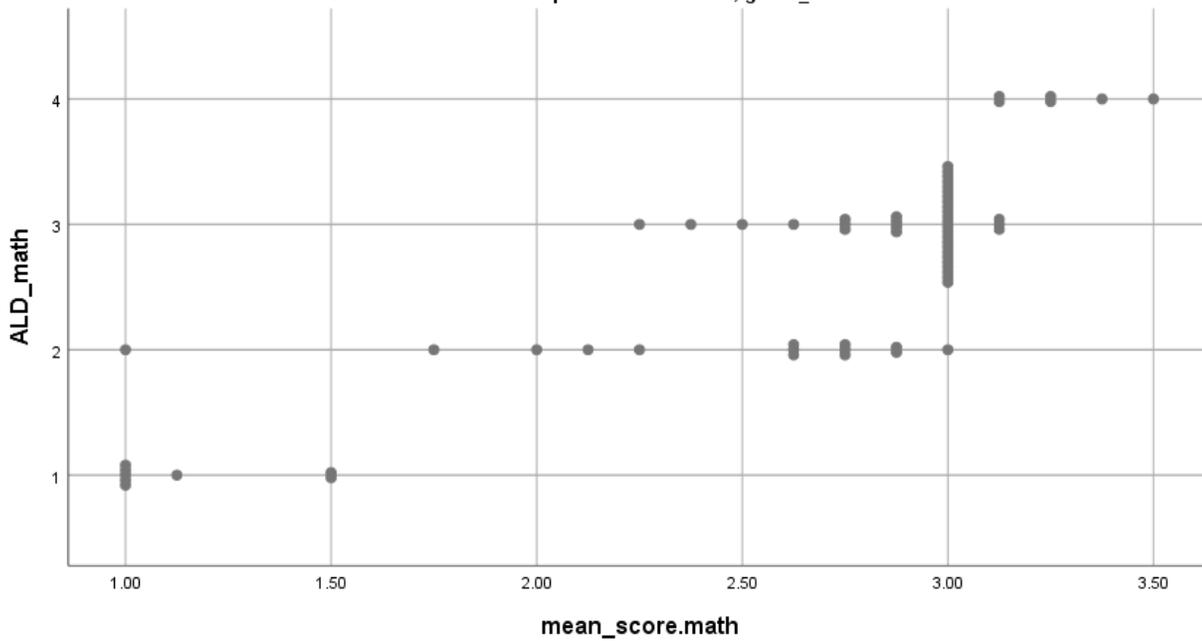
Simple Scatter of ALD_math by mean_score.math

sauname: Haverhill Cooperative SAU Office, grade_code: 7



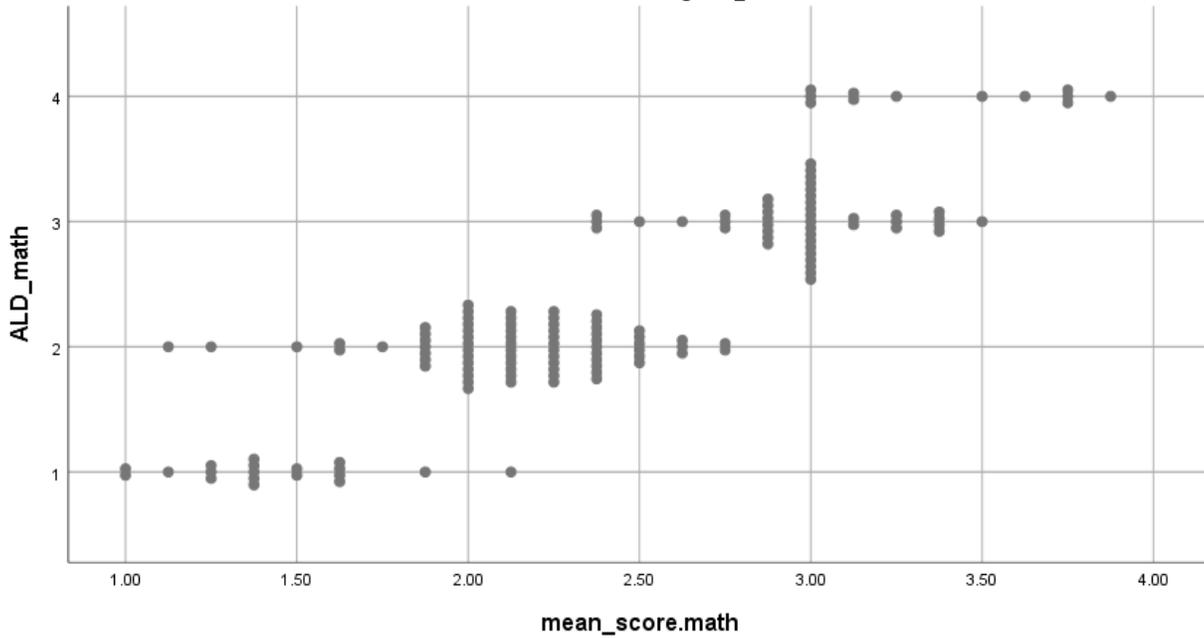
Simple Scatter of ALD_math by mean_score.math

sauname: Haverhill Cooperative SAU Office, grade_code: 8



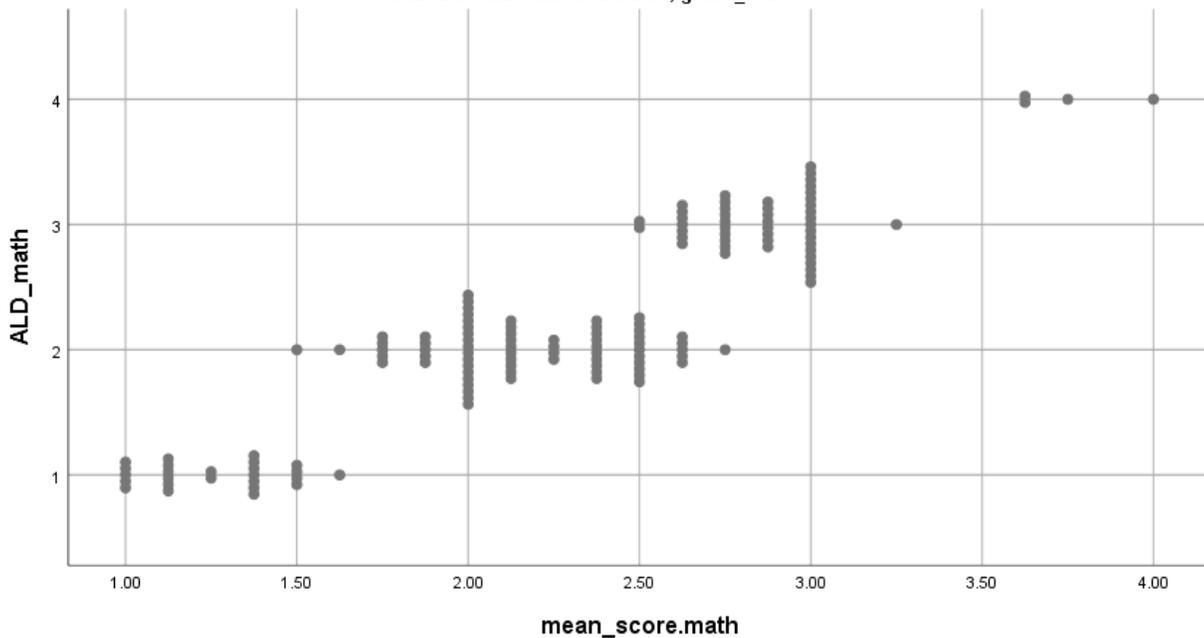
Simple Scatter of ALD_math by mean_score.math

sauname: Laconia SAU Office, grade_code: 3



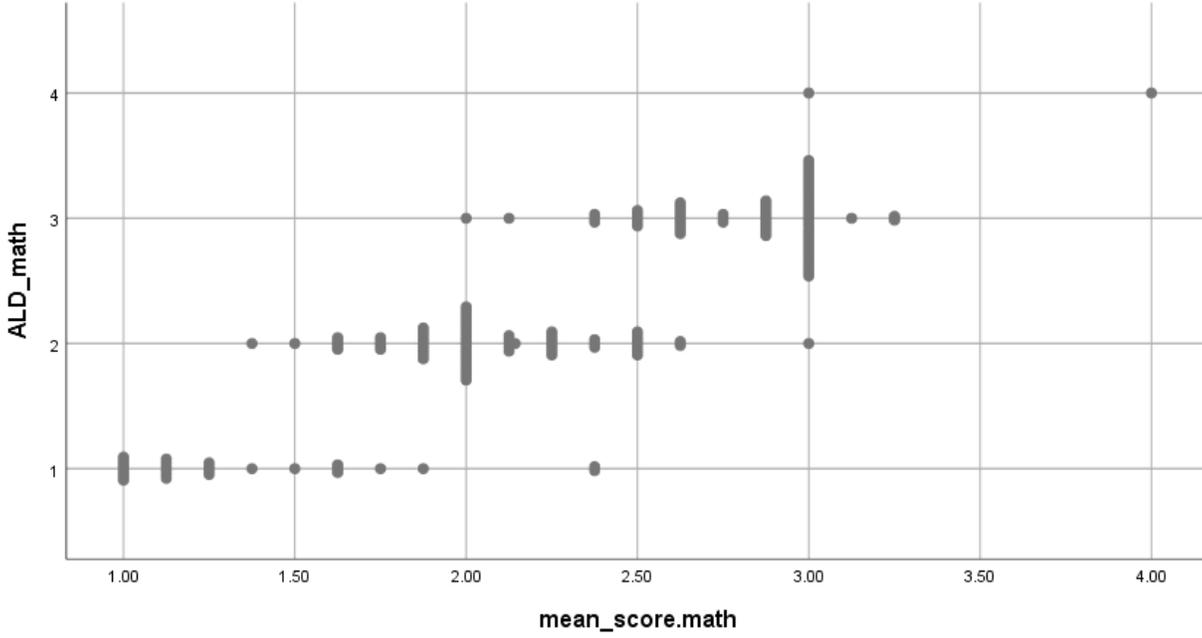
Simple Scatter of ALD_math by mean_score.math

sauname: Laconia SAU Office, grade_code: 4



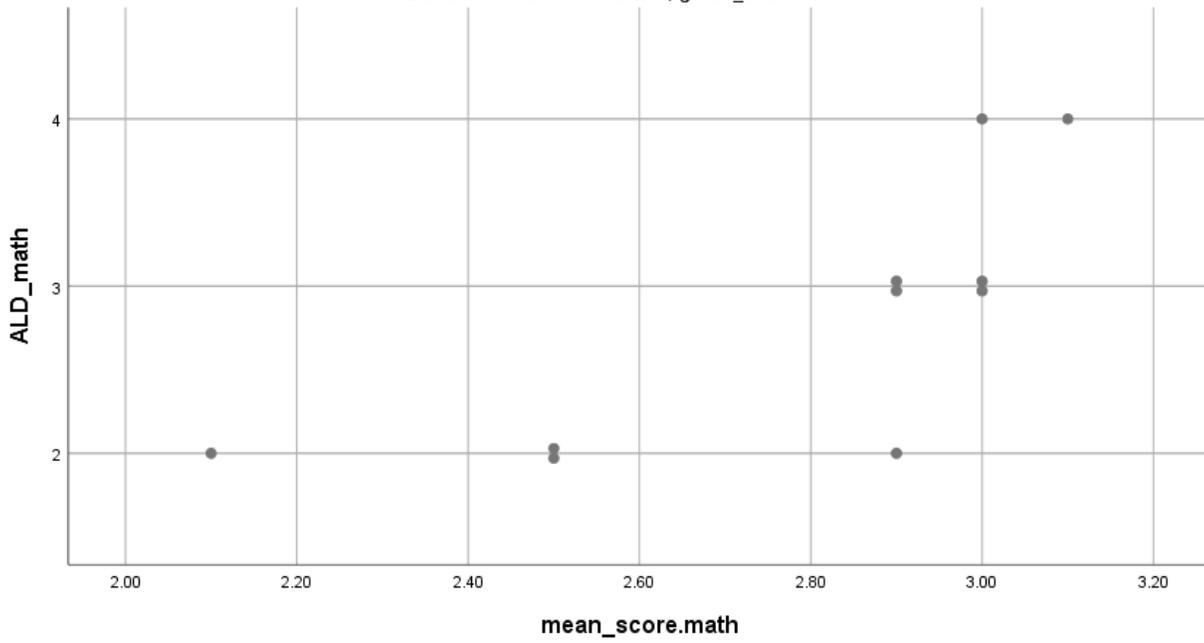
Simple Scatter of ALD_math by mean_score.math

sauname: Laconia SAU Office, grade_code: 5



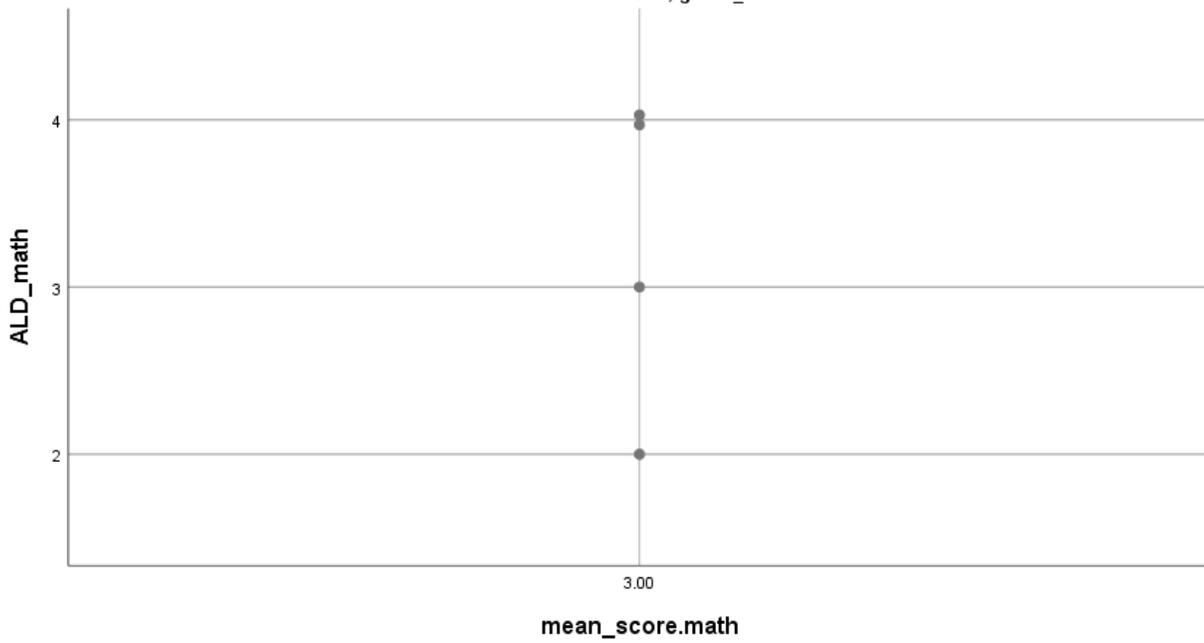
Simple Scatter of ALD_math by mean_score.math

sauname: Monroe SAU Office, grade_code: 3



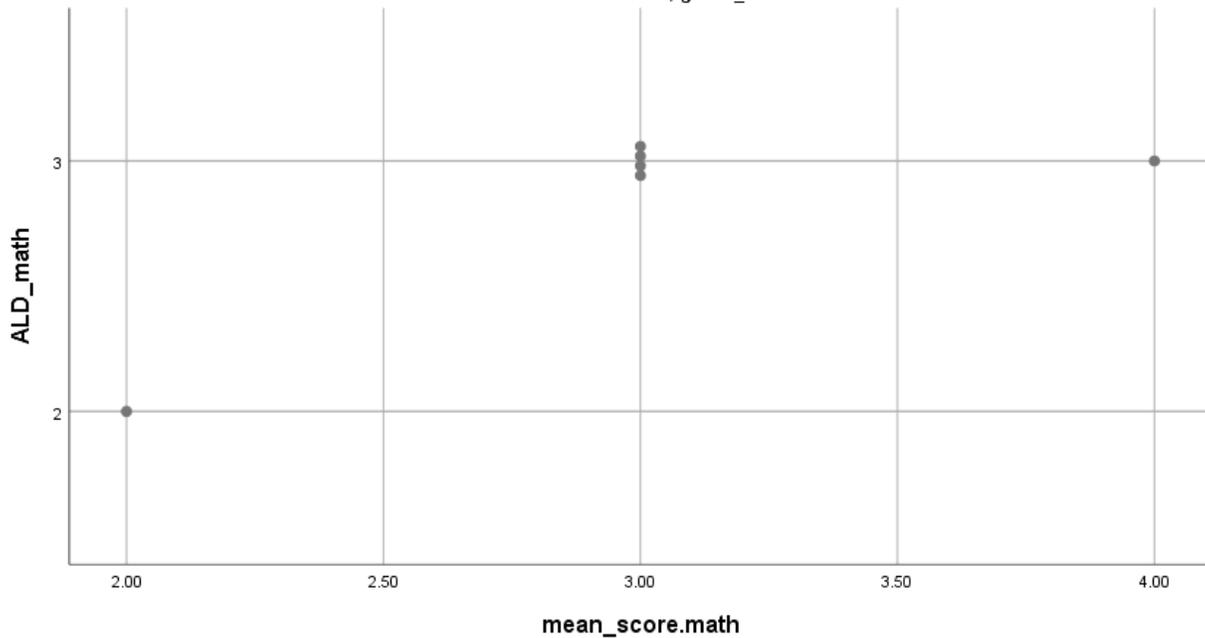
Simple Scatter of ALD_math by mean_score.math

sauname: Monroe SAU Office, grade_code: 4



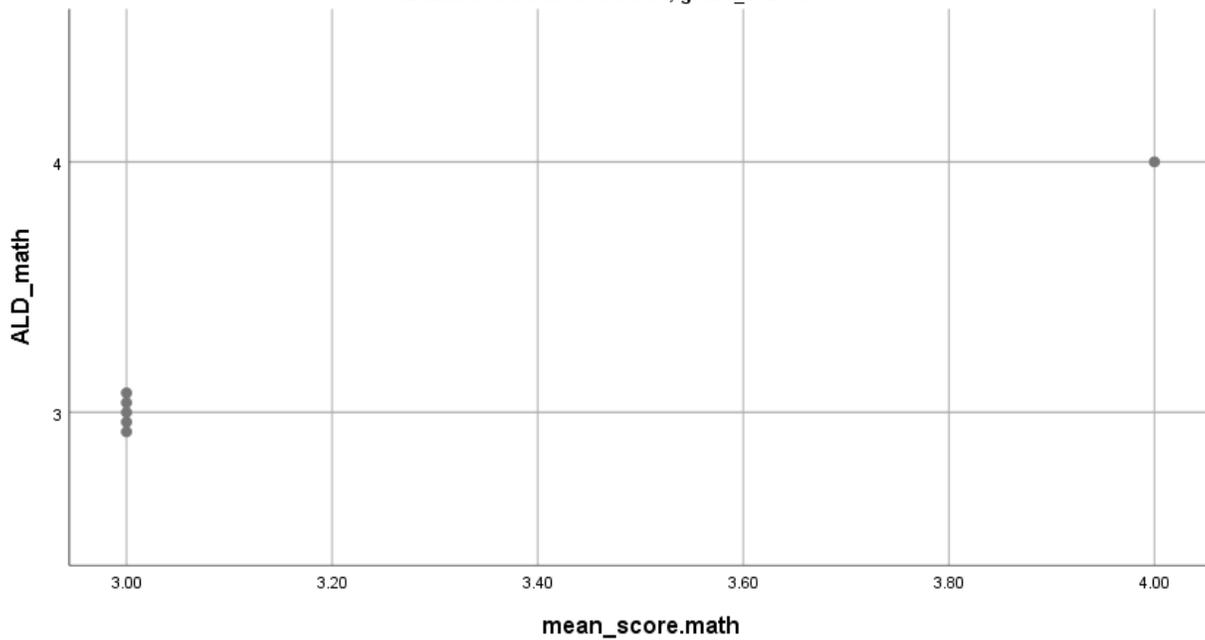
Simple Scatter of ALD_math by mean_score.math

sauname: Monroe SAU Office, grade_code: 5



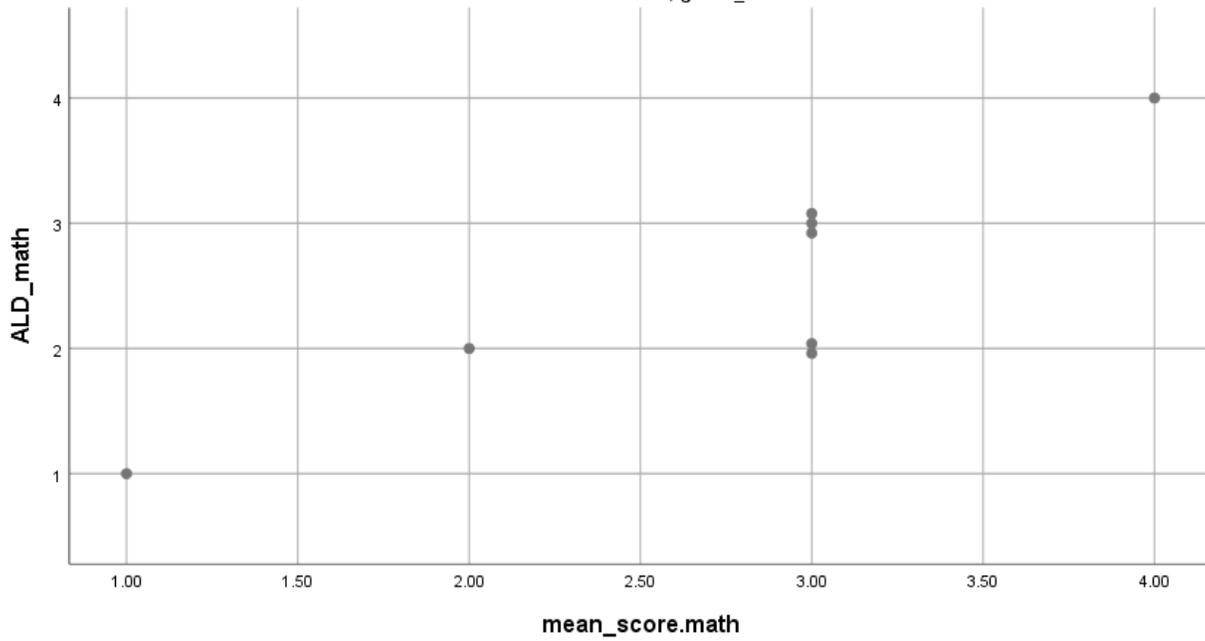
Simple Scatter of ALD_math by mean_score.math

sauname: Monroe SAU Office, grade_code: 6



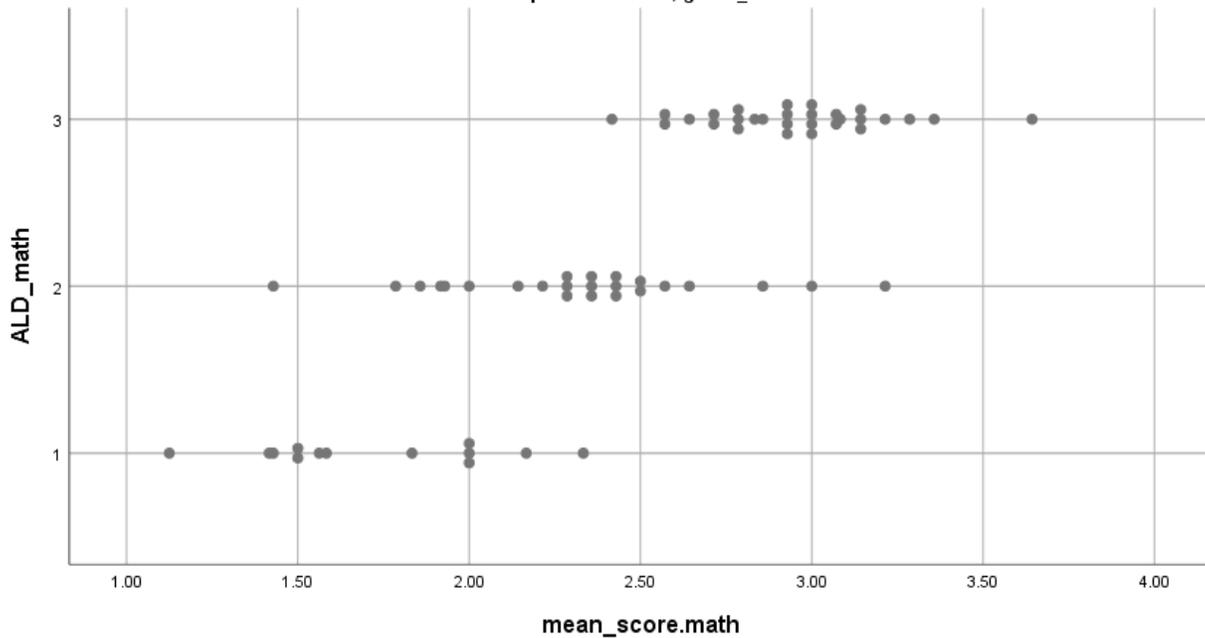
Simple Scatter of ALD_math by mean_score.math

sauname: Monroe SAU Office, grade_code: 7



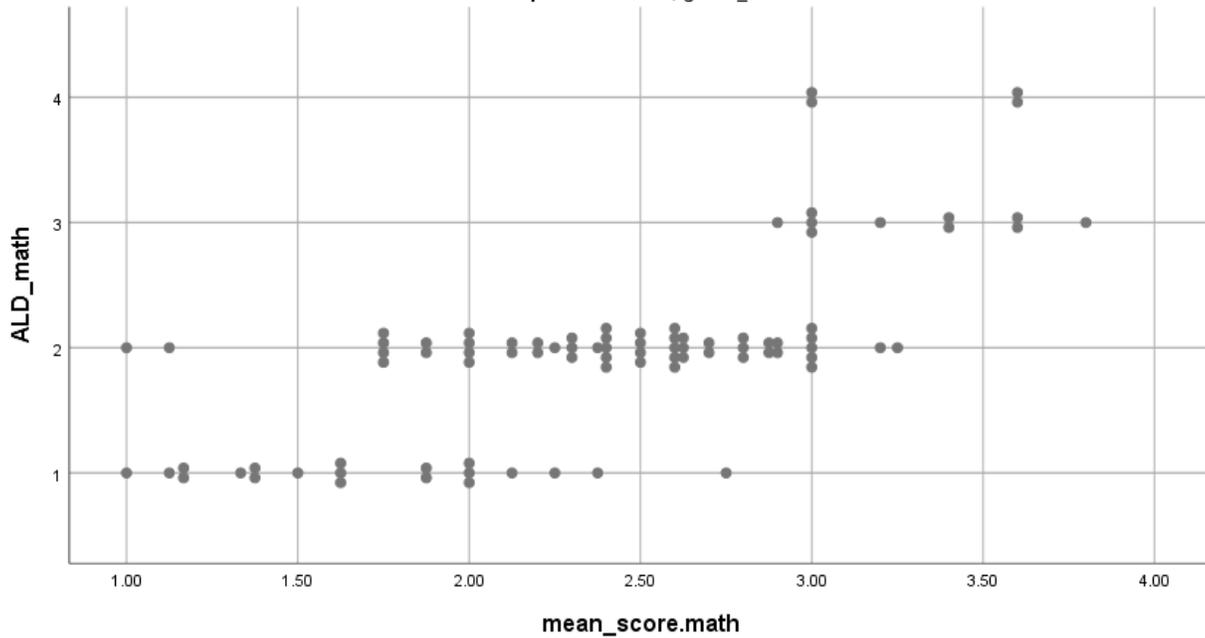
Simple Scatter of ALD_math by mean_score.math

sauname: Newport SAU Office, grade_code: 4



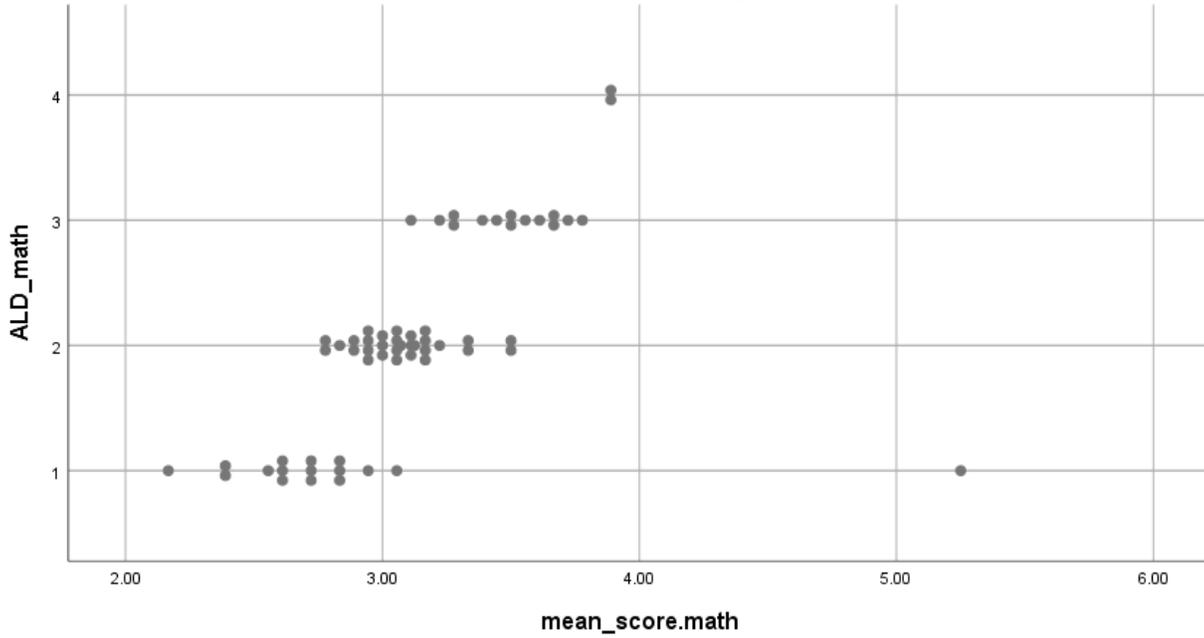
Simple Scatter of ALD_math by mean_score.math

sauname: Newport SAU Office, grade_code: 5



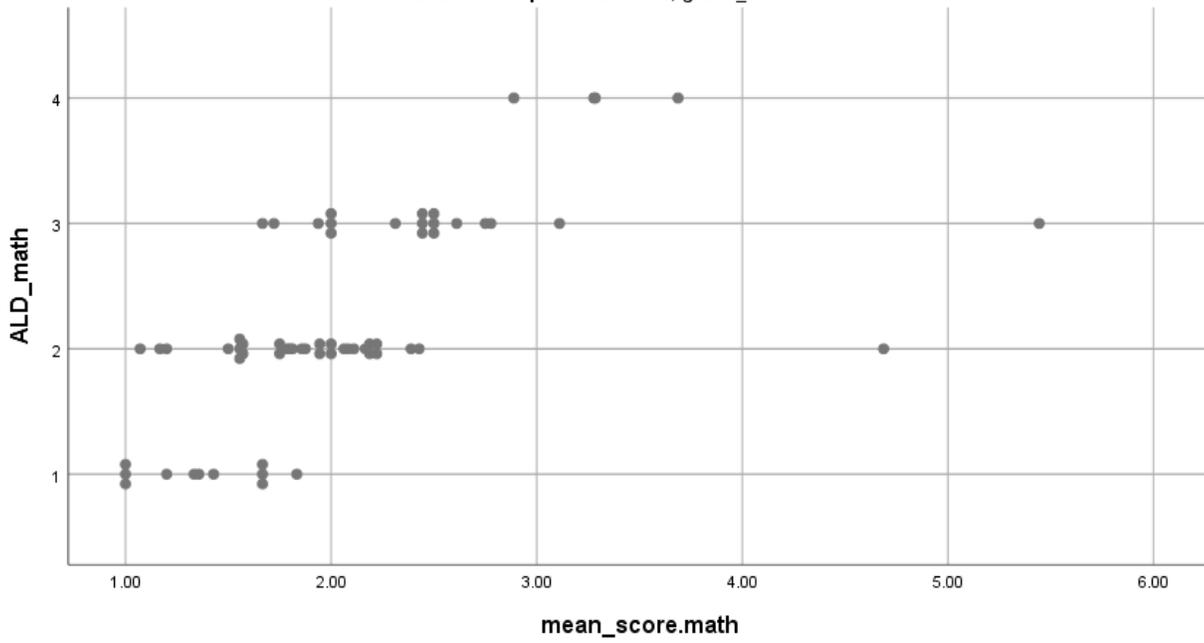
Simple Scatter of ALD_math by mean_score.math

sauname: Newport SAU Office, grade_code: 6



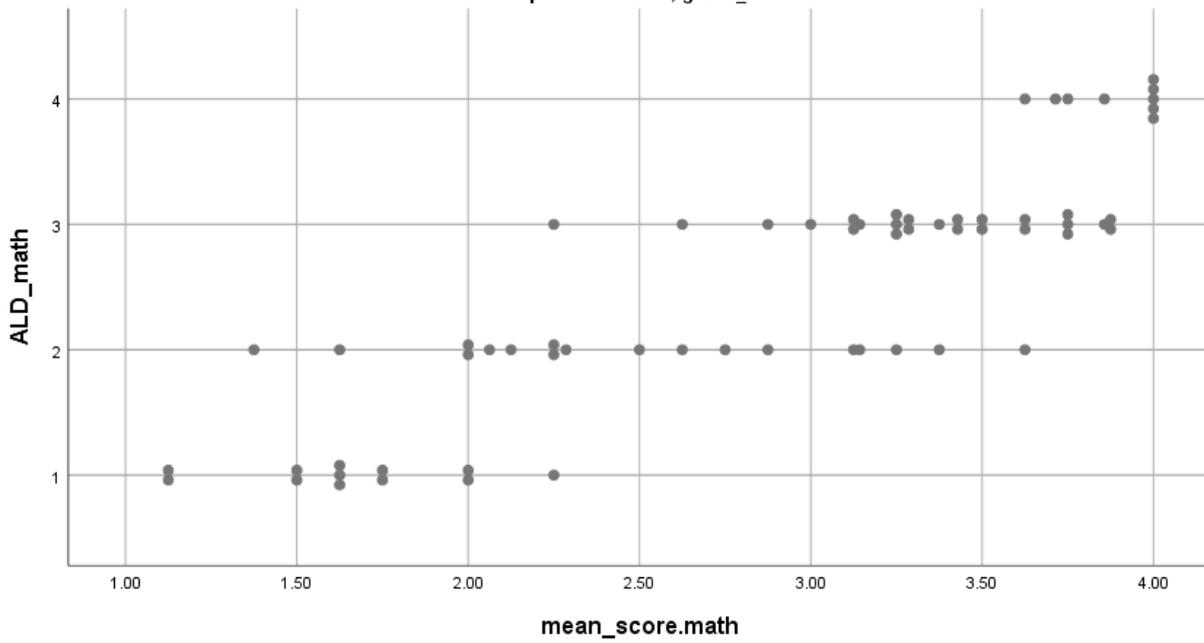
Simple Scatter of ALD_math by mean_score.math

sauname: Newport SAU Office, grade_code: 7



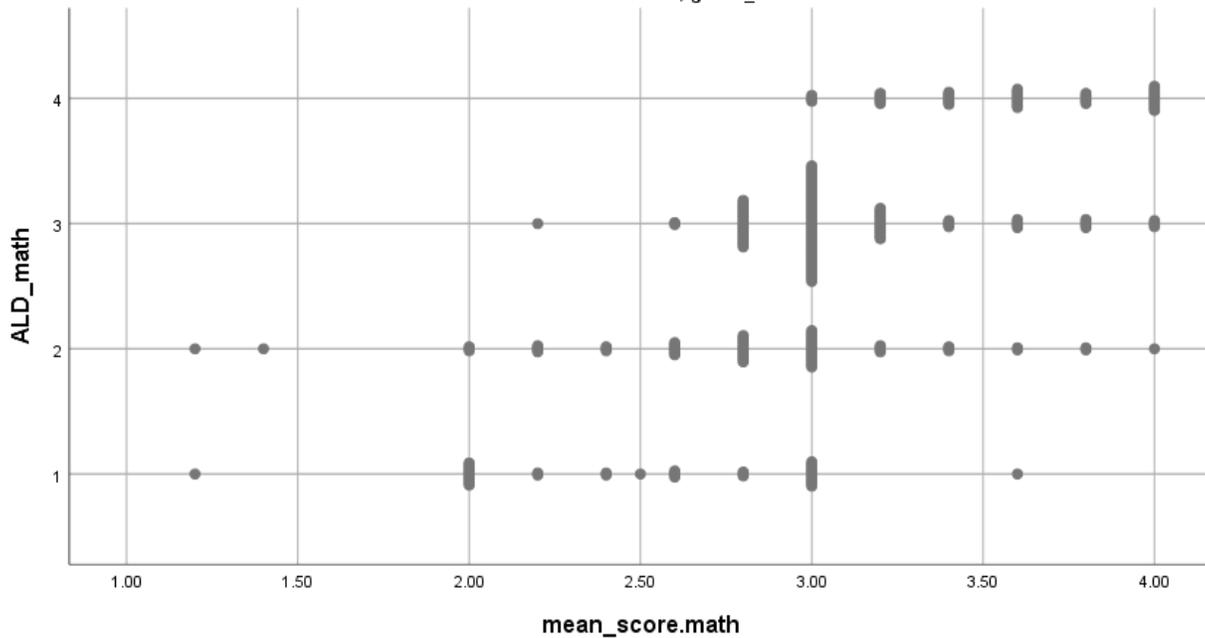
Simple Scatter of ALD_math by mean_score.math

sauname: Newport SAU Office, grade_code: 8



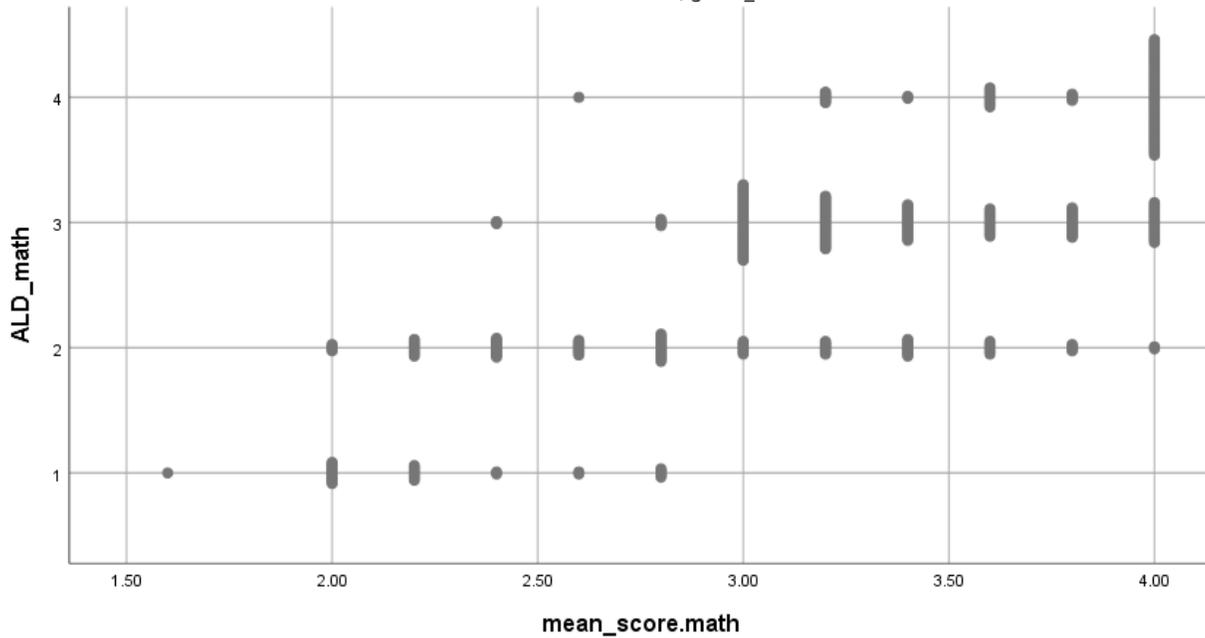
Simple Scatter of ALD_math by mean_score.math

sauname: Rochester SAU Office, grade_code: 3



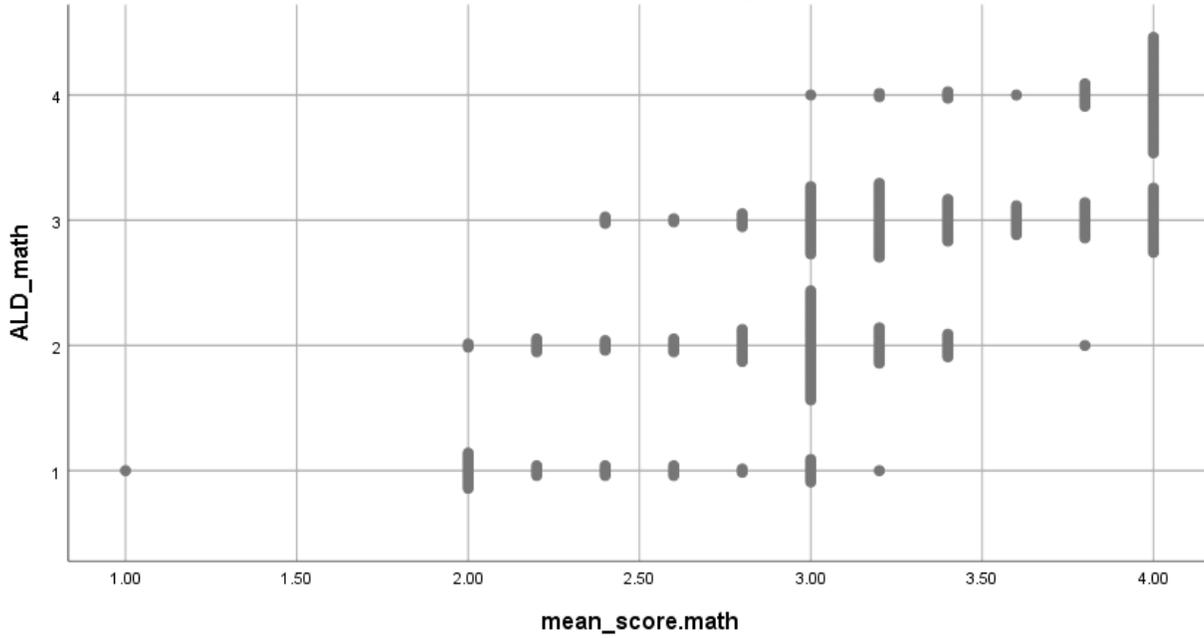
Simple Scatter of ALD_math by mean_score.math

sauname: Rochester SAU Office, grade_code: 4



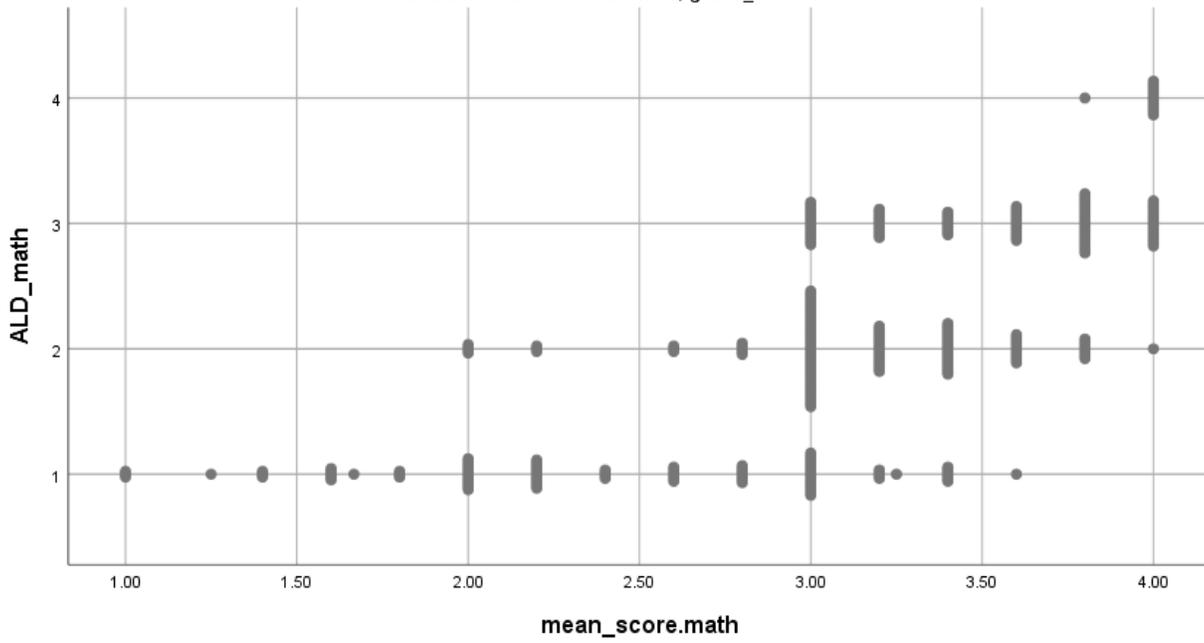
Simple Scatter of ALD_math by mean_score.math

sauname: Rochester SAU Office, grade_code: 5



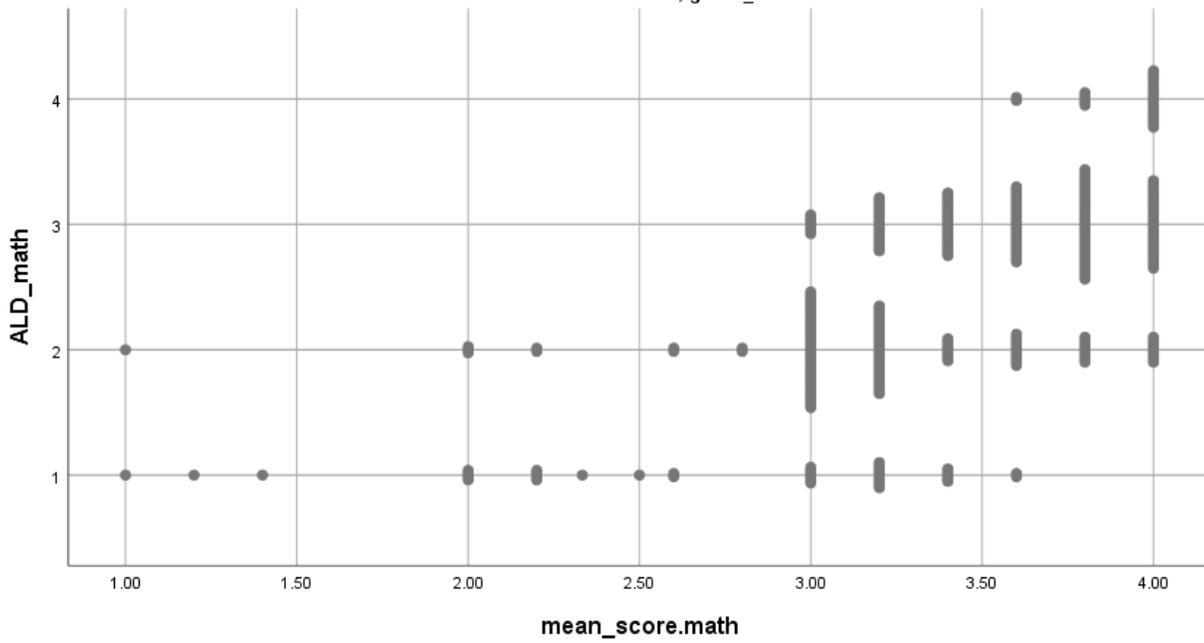
Simple Scatter of ALD_math by mean_score.math

sauname: Rochester SAU Office, grade_code: 6



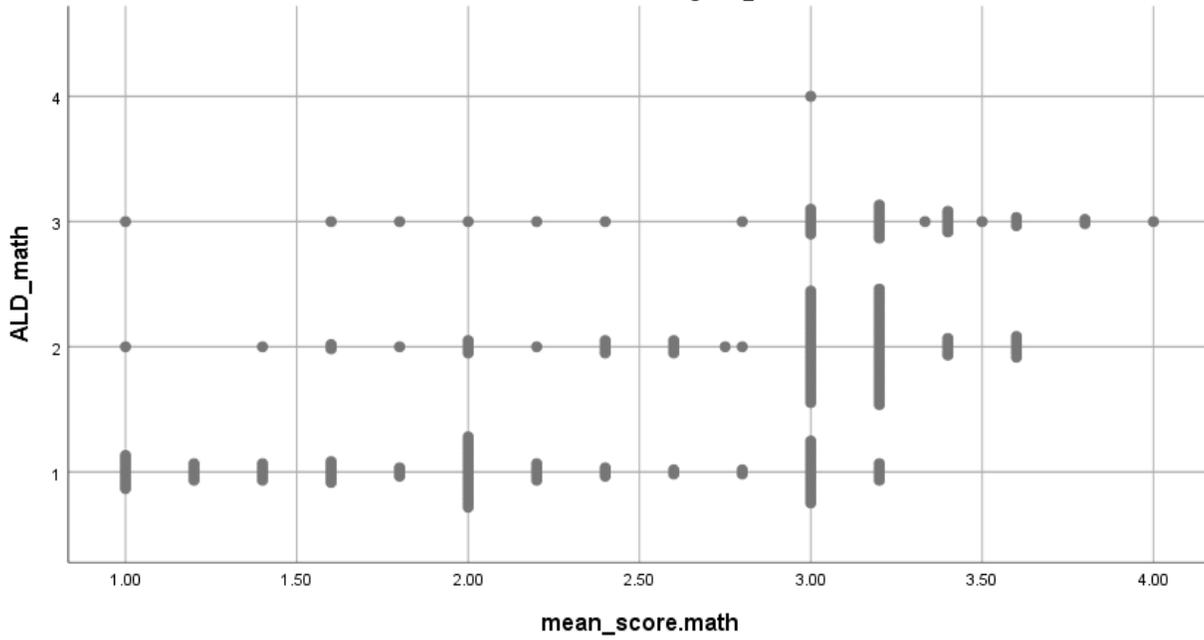
Simple Scatter of ALD_math by mean_score.math

sauname: Rochester SAU Office, grade_code: 7



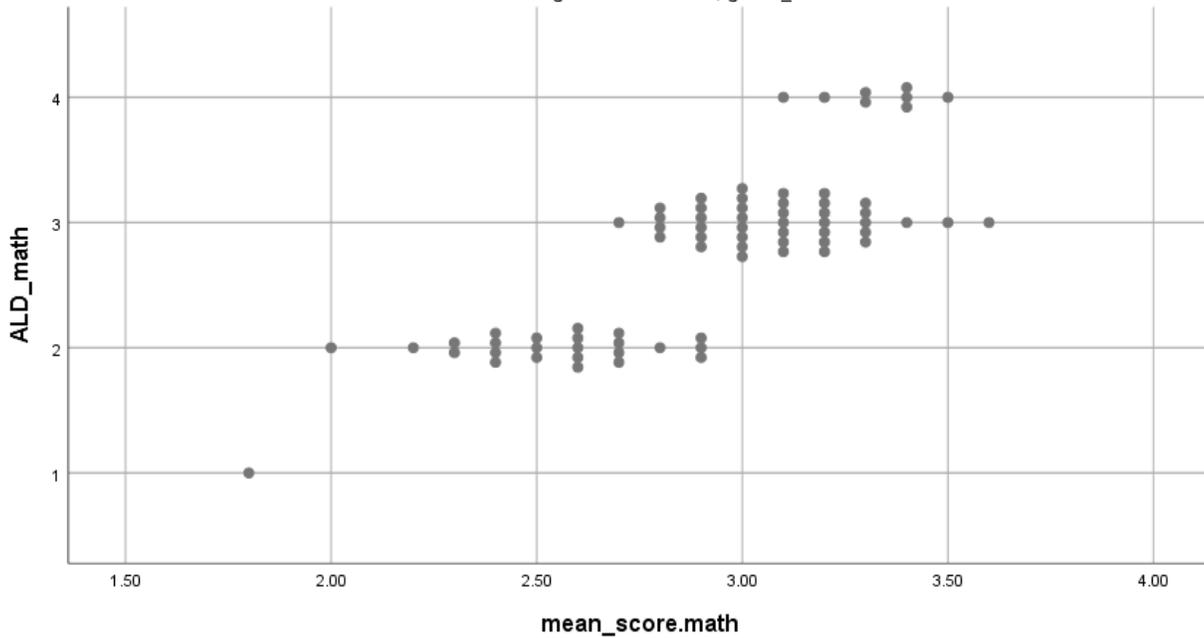
Simple Scatter of ALD_math by mean_score.math

sauname: Rochester SAU Office, grade_code: 8



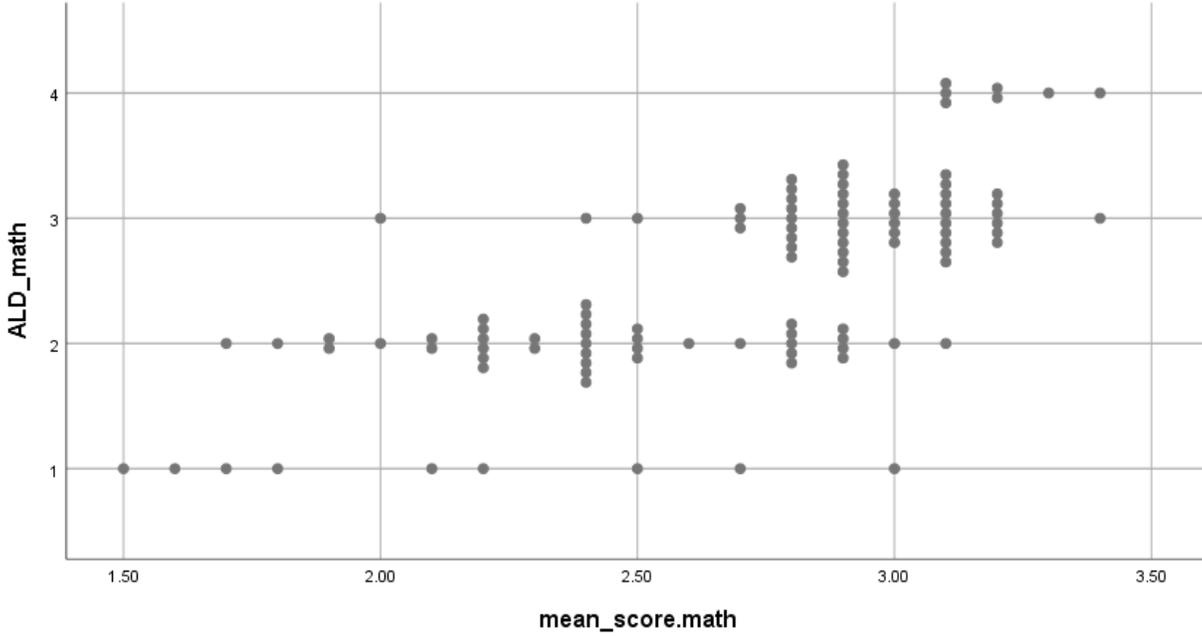
Simple Scatter of ALD_math by mean_score.math

sauname: Sanborn Regional SAU Office, grade_code: 3



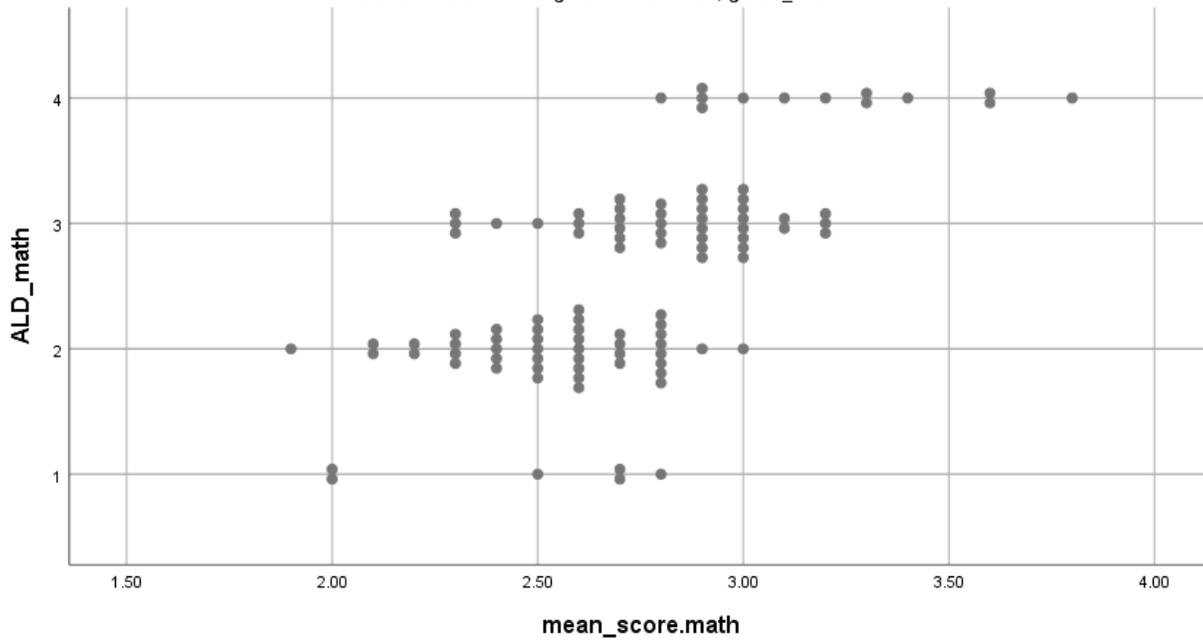
Simple Scatter of ALD_math by mean_score.math

sauname: Sanborn Regional SAU Office, grade_code: 4



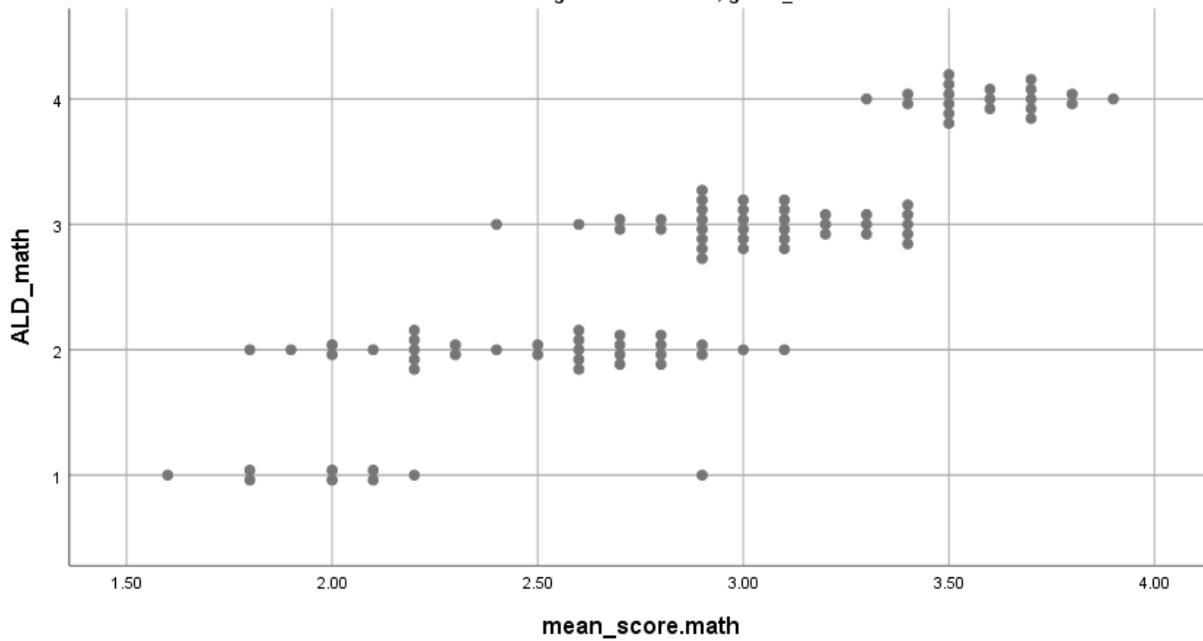
Simple Scatter of ALD_math by mean_score.math

sauname: Sanborn Regional SAU Office, grade_code: 5



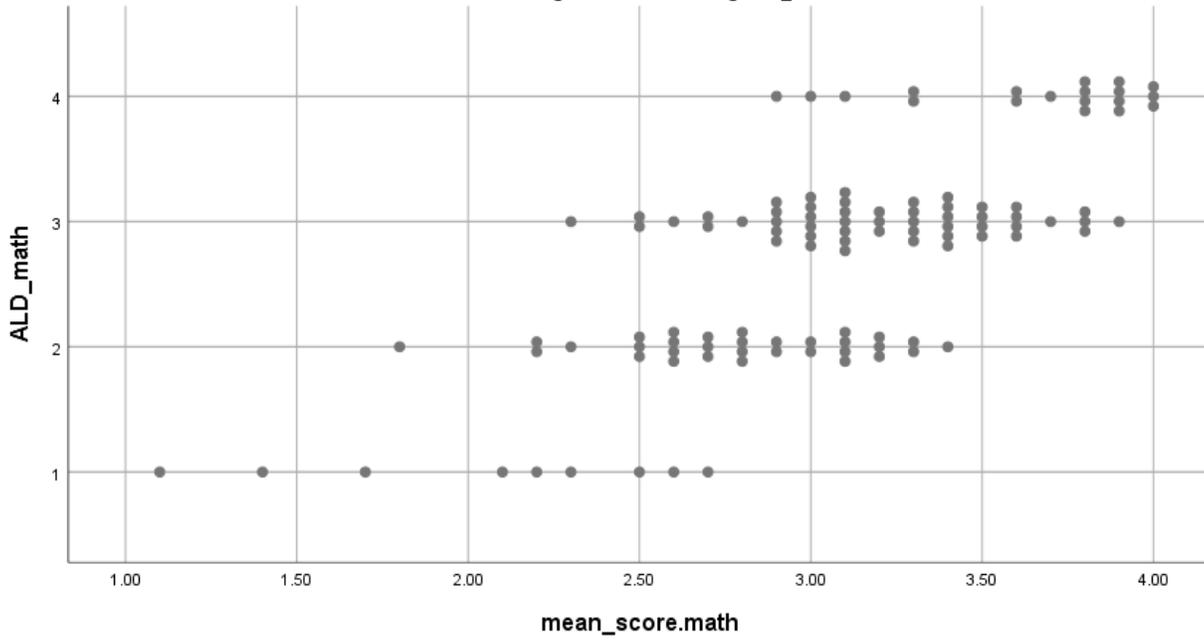
Simple Scatter of ALD_math by mean_score.math

sauname: Sanborn Regional SAU Office, grade_code: 6



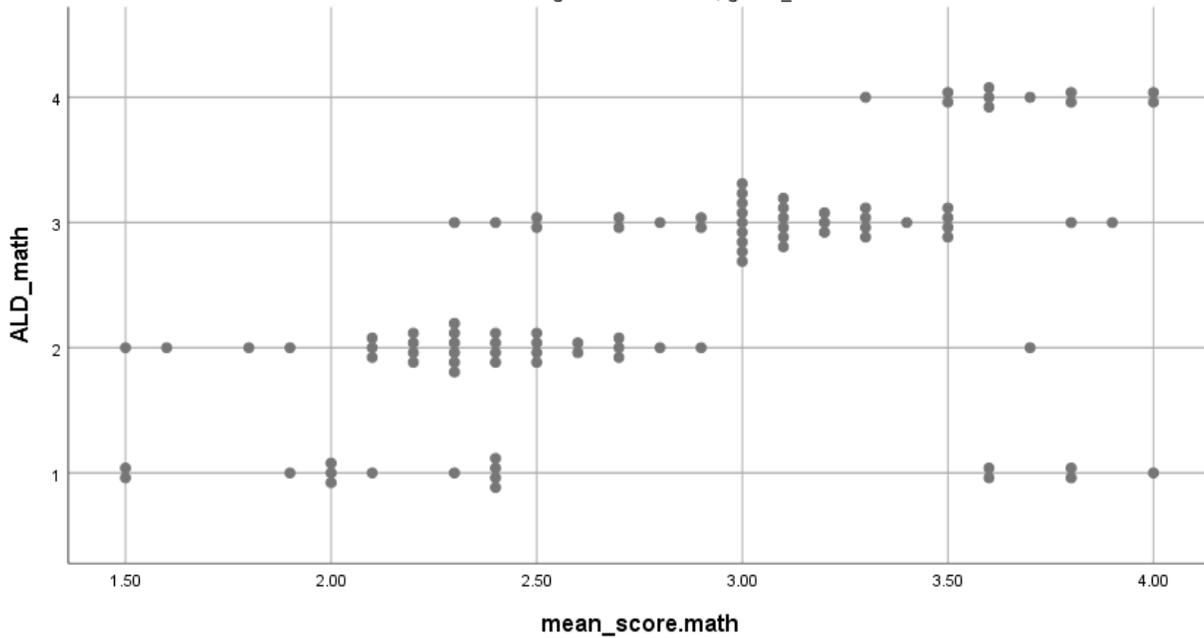
Simple Scatter of ALD_math by mean_score.math

sauname: Sanborn Regional SAU Office, grade_code: 7



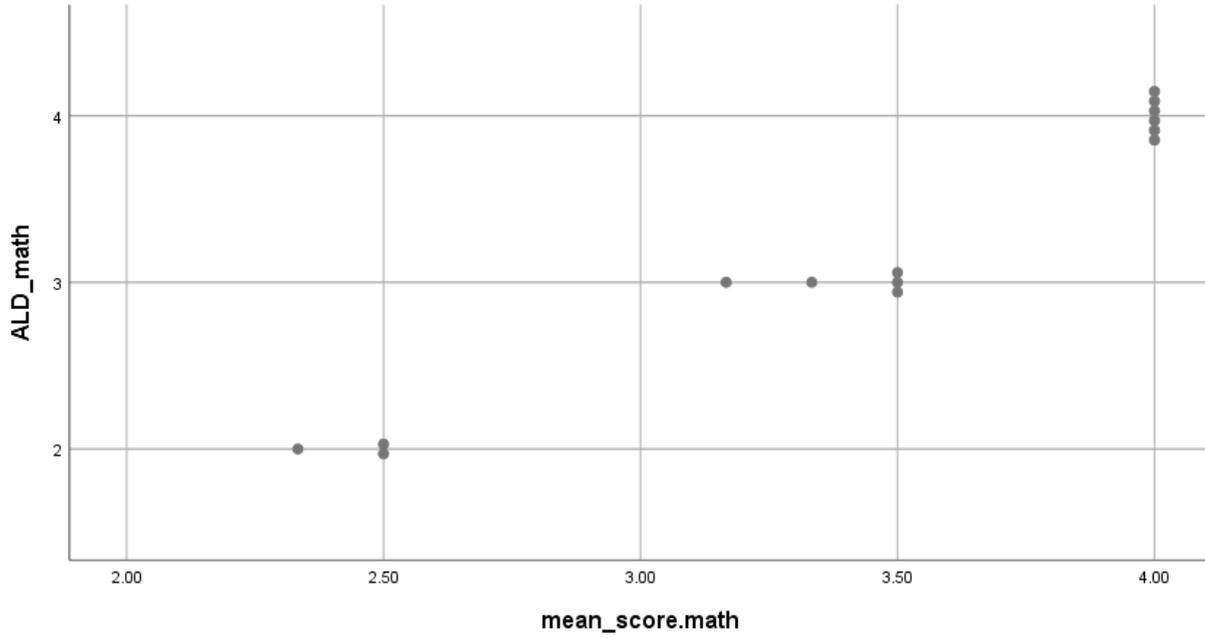
Simple Scatter of ALD_math by mean_score.math

sauname: Sanborn Regional SAU Office, grade_code: 8



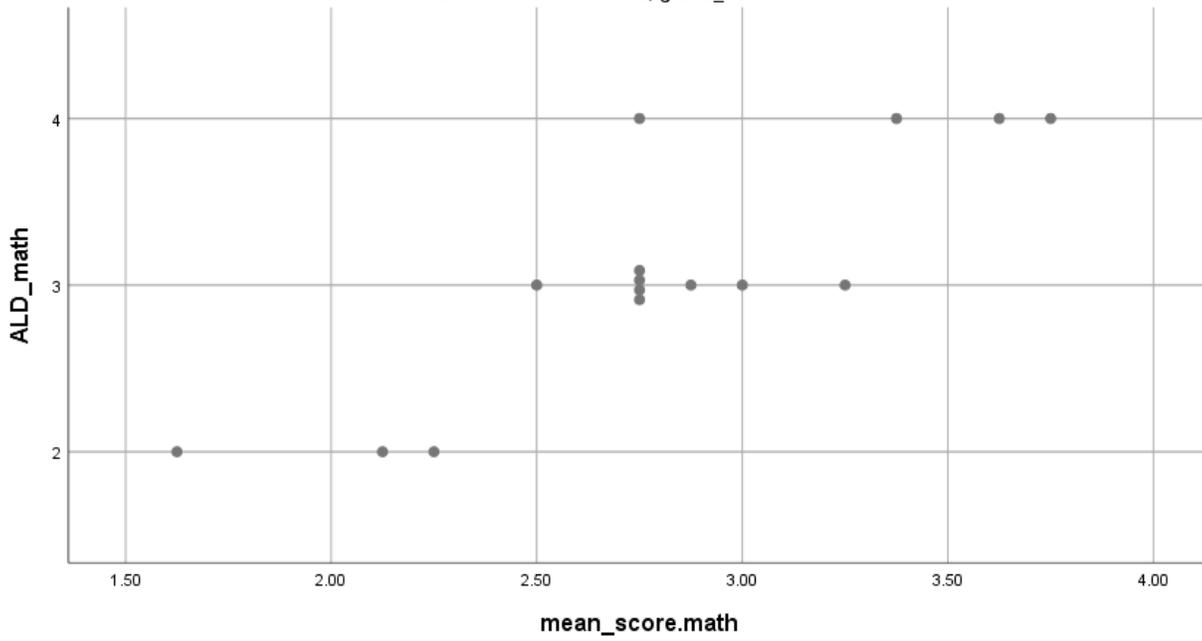
Simple Scatter of ALD_math by mean_score.math

sauname: SAU #35 Office, grade_code: 3



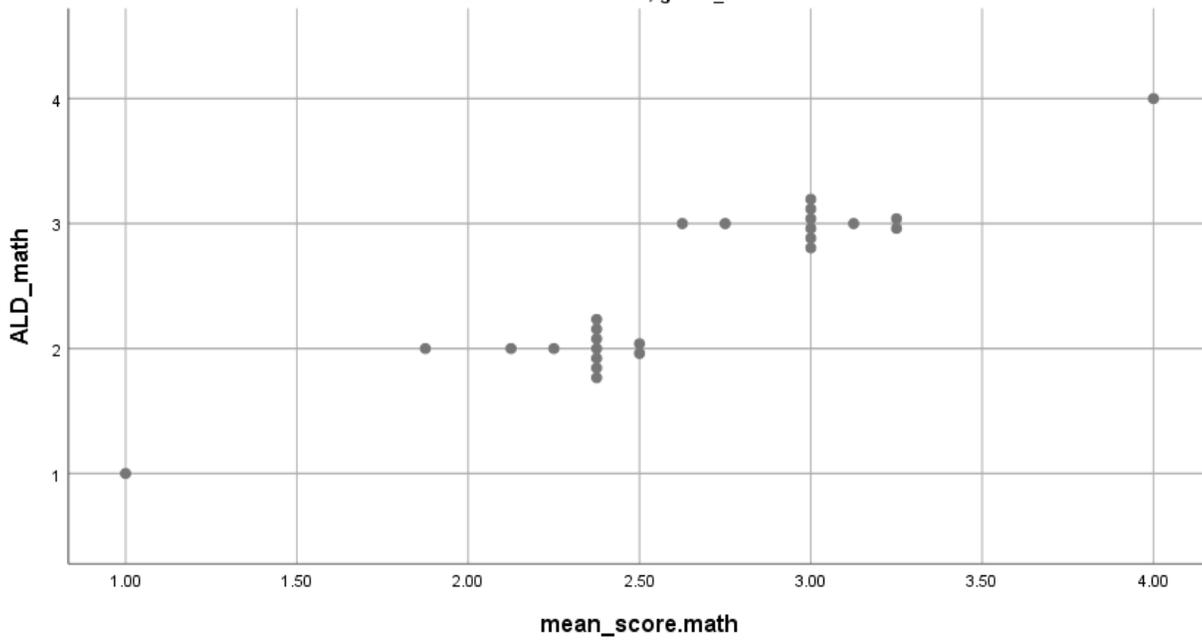
Simple Scatter of ALD_math by mean_score.math

sauname: SAU #35 Office, grade_code: 4



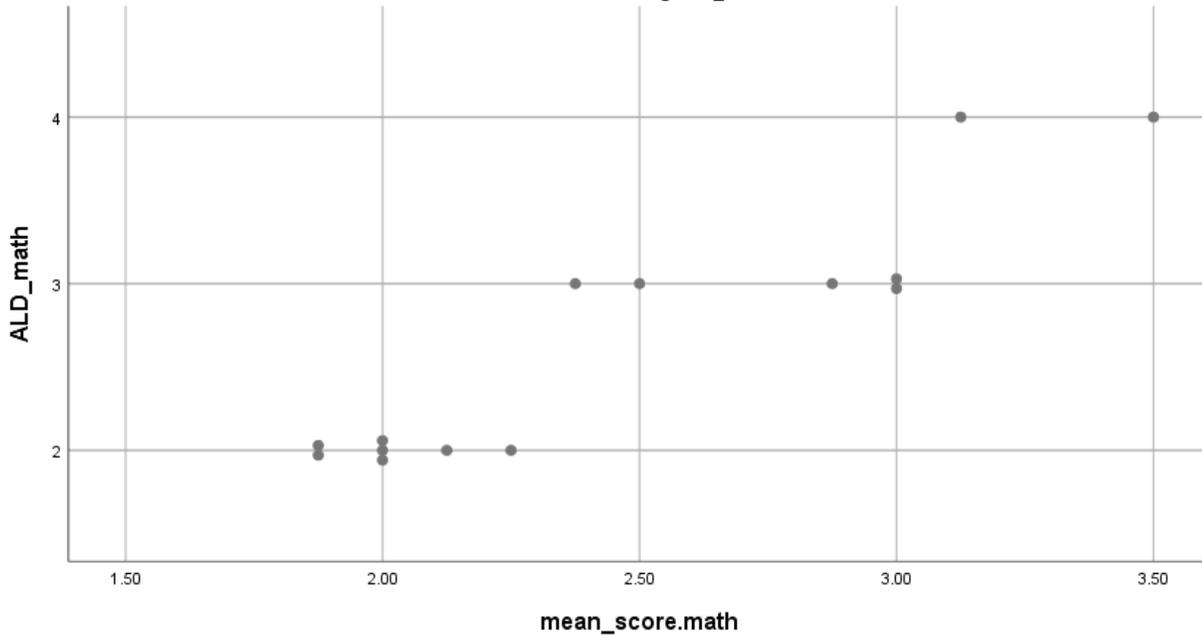
Simple Scatter of ALD_math by mean_score.math

sauname: SAU #35 Office, grade_code: 5



Simple Scatter of ALD_math by mean_score.math

sauname: SAU #35 Office, grade_code: 6



Math Descriptives

Descriptive Statistics

sauname	grade_code		N	Minimum	Maximum	Mean	Std. Deviation
Amherst SAU Office	5	mean_score.math	151	1.31	3.70	2.8878	.40221
		ALD_math	151	1	4	2.87	.846
		Valid N (listwise)	150				
	6	mean_score.math	139	1.86	3.89	2.9091	.45208
		ALD_math	142	1	4	2.86	.813
		Valid N (listwise)	139				
	7	mean_score.math	159	1.82	3.43	2.9129	.28768
		ALD_math	160	1	4	3.06	.715
		Valid N (listwise)	158				
8	mean_score.math	177	1.86	3.67	2.9318	.32798	
	ALD_math	177	1	4	2.90	.754	

		Valid N (listwise)	177				
Charter Schools	3	mean_score.math	31	1.00	4.00	2.6452	.72965
		ALD_math	32	1	4	2.59	1.012
		Valid N (listwise)	31				
	4	mean_score.math	32	1.75	4.00	2.6406	.52339
		ALD_math	28	1	4	2.36	.870
		Valid N (listwise)	28				
	5	mean_score.math	35	1.50	4.00	2.8857	.57312
		ALD_math	31	1	4	2.48	.626
		Valid N (listwise)	31				
	6	mean_score.math	31	1.50	3.50	2.5887	.60052
		ALD_math	28	1	4	2.57	.997
		Valid N (listwise)	27				
	7	mean_score.math	33	1.00	4.00	2.5758	.75902
		ALD_math	26	1	4	2.77	.765
		Valid N (listwise)	26				
8	mean_score.math	35	1.25	4.00	2.4357	.66792	
	ALD_math	34	2	4	2.56	.705	
	Valid N (listwise)	34					
Concord SAU Office	3	mean_score.math	288	1.00	3.93	2.6475	.53253
		ALD_math	293	1	4	2.50	.833
		Valid N (listwise)	288				
	4	mean_score.math	298	1.00	4.00	2.6989	.58633
		ALD_math	299	1	4	2.65	.803
		Valid N (listwise)	297				
	5	mean_score.math	318	1.00	4.00	2.7281	.56387

		ALD_math	319	1	4	2.61	.825
		Valid N (listwise)	317				
	6	mean_score.math	324	1.00	4.00	2.6221	.69236
		ALD_math	320	1	4	2.27	.840
		Valid N (listwise)	319				
	7	mean_score.math	310	1.00	4.00	2.6336	.83299
		ALD_math	316	1	4	2.18	.934
		Valid N (listwise)	309				
	8	mean_score.math	290	1.00	3.83	2.4737	.63469
		ALD_math	292	1	4	2.53	.906
		Valid N (listwise)	290				
Conway SAU Office	3	mean_score.math	39	1.00	3.14	2.5971	.48927
		ALD_math	39	1	3	2.62	.633
		Valid N (listwise)	39				
	4	mean_score.math	36	1.00	3.86	2.6032	.83656
		ALD_math	36	1	4	2.64	.762
		Valid N (listwise)	36				
	5	mean_score.math	41	1.86	4.00	2.8571	.44493
		ALD_math	41	1	4	2.59	.670
		Valid N (listwise)	41				
	6	mean_score.math	42	2.00	3.43	2.9116	.39528
		ALD_math	42	1	3	2.55	.633
		Valid N (listwise)	42				
Epping SAU Office	3	mean_score.math	77	1.00	3.80	2.7266	.52388
		ALD_math	77	1	4	2.73	.553
		Valid N (listwise)	77				

	4	mean_score.math	68	1.00	4.00	2.7776	.61215
		ALD_math	68	1	4	2.75	.780
		Valid N (listwise)	68				
	5	mean_score.math	63	1.35	3.90	2.8238	.56117
		ALD_math	63	1	4	2.65	.845
		Valid N (listwise)	63				
	6	mean_score.math	75	1.00	4.00	2.7627	.73540
		ALD_math	75	1	4	2.71	.941
		Valid N (listwise)	75				
7	mean_score.math	65	1.00	4.00	2.6300	.76943	
	ALD_math	66	1	4	2.41	.928	
	Valid N (listwise)	65					
8	mean_score.math	68	1.00	4.00	2.9824	.82357	
	ALD_math	68	1	4	3.01	.837	
	Valid N (listwise)	68					
Haverhill Cooperative SAU Office	3	mean_score.math	74	1.25	4.00	2.8632	.61313
		ALD_math	73	1	4	2.67	.783
		Valid N (listwise)	73				
	4	mean_score.math	72	1.00	4.00	2.3542	.72736
		ALD_math	73	1	4	2.55	.929
		Valid N (listwise)	72				
	5	mean_score.math	51	1.00	3.88	2.4167	.67531
		ALD_math	51	1	4	2.31	.761
		Valid N (listwise)	51				
	6	mean_score.math	87	1.00	4.00	2.5516	.77788
		ALD_math	88	1	4	2.45	.843

		Valid N (listwise)	87				
	7	mean_score.math	13	1.38	3.50	2.5673	.67819
		ALD_math	14	1	4	2.57	.938
		Valid N (listwise)	13				
	8	mean_score.math	66	1.00	3.50	2.6307	.67633
		ALD_math	67	1	4	2.61	.834
		Valid N (listwise)	66				
Laconia SAU Office	3	mean_score.math	149	1.00	3.88	2.4060	.64116
		ALD_math	149	1	4	2.34	.802
		Valid N (listwise)	149				
	4	mean_score.math	148	1.00	4.00	2.2829	.63292
		ALD_math	147	1	4	2.20	.749
		Valid N (listwise)	147				
	5	mean_score.math	159	1.00	4.00	2.2863	.63273
		ALD_math	160	1	4	2.27	.744
		Valid N (listwise)	159				
Monroe SAU Office	3	mean_score.math	10	2.10	3.10	2.7900	.31780
		ALD_math	11	2	4	2.73	.786
		Valid N (listwise)	10				
	4	mean_score.math	4	3.00	3.00	3.0000	.00000
		ALD_math	4	2	4	3.25	.957
		Valid N (listwise)	4				
	5	mean_score.math	6	2.00	4.00	3.0000	.63246
		ALD_math	6	2	3	2.83	.408
		Valid N (listwise)	6				
6	mean_score.math	6	3.00	4.00	3.1667	.40825	

		ALD_math	6	3	4	3.17	.408
		Valid N (listwise)	6				
	7	mean_score.math	8	1.00	4.00	2.7500	.88641
		ALD_math	8	1	4	2.50	.926
		Valid N (listwise)	8				
	8	mean_score.math	12	1.00	4.00	2.9167	.90034
		ALD_math	12	1	4	2.75	.965
		Valid N (listwise)	12				
Newport SAU Office	3	mean_score.math	68	1.00	6.20	2.2025	1.04077
		ALD_math	64	1	4	2.34	.900
		Valid N (listwise)	64				
	4	mean_score.math	68	1.13	3.64	2.4782	.56804
		ALD_math	66	1	3	2.24	.766
		Valid N (listwise)	66				
	5	mean_score.math	91	1.00	3.80	2.3662	.68214
		ALD_math	88	1	4	1.98	.727
		Valid N (listwise)	88				
	6	mean_score.math	65	2.00	5.25	3.1029	.47342
		ALD_math	62	1	4	2.03	.789
		Valid N (listwise)	62				
	7	mean_score.math	67	1.00	5.44	2.1147	.79283
		ALD_math	66	1	4	2.20	.827
		Valid N (listwise)	64				
	8	mean_score.math	71	1.00	4.00	2.8371	.89202
		ALD_math	65	1	4	2.46	.969
		Valid N (listwise)	64				

Rochester SAU Office	3	mean_score.math	277	1.20	4.00	3.0126	.51515
		ALD_math	268	1	4	2.64	.931
		Valid N (listwise)	268				
	4	mean_score.math	330	1.00	4.00	3.2505	.63432
		ALD_math	326	1	4	2.82	.905
		Valid N (listwise)	325				
	5	mean_score.math	287	1.00	4.00	3.2235	.58949
		ALD_math	284	1	4	2.64	.924
		Valid N (listwise)	284				
	6	mean_score.math	305	1.00	4.00	3.0959	.65920
		ALD_math	302	1	4	2.10	.866
		Valid N (listwise)	299				
	7	mean_score.math	324	1.00	4.00	3.3671	.55487
		ALD_math	315	1	4	2.47	.815
		Valid N (listwise)	313				
	8	mean_score.math	208	1.00	4.00	2.6352	.75629
		ALD_math	285	1	4	2.08	.868
		Valid N (listwise)	205				
Sanborn Regional SAU Office	3	mean_score.math	75	.00	3.60	2.8800	.49647
		ALD_math	74	1	4	2.76	.658
		Valid N (listwise)	74				
	4	mean_score.math	107	1.50	3.40	2.6916	.43331
		ALD_math	107	1	4	2.51	.744
		Valid N (listwise)	107				
	5	mean_score.math	103	1.90	3.80	2.7282	.34226
		ALD_math	103	1	4	2.58	.786

		Valid N (listwise)	103				
	6	mean_score.math	98	1.60	3.90	2.8816	.54892
		ALD_math	98	1	4	2.69	.901
		Valid N (listwise)	98				
	7	mean_score.math	112	1.10	4.00	3.0679	.55527
		ALD_math	115	1	4	2.74	.849
		Valid N (listwise)	112				
	8	mean_score.math	99	1.50	4.00	2.8212	.63748
		ALD_math	99	1	4	2.43	.905
		Valid N (listwise)	99				
SAU #35 Office	3	mean_score.math	14	2.33	4.00	3.4524	.61820
		ALD_math	14	2	4	3.21	.802
		Valid N (listwise)	14				
	4	mean_score.math	15	1.63	3.75	2.8083	.56074
		ALD_math	15	2	4	3.07	.704
		Valid N (listwise)	15				
	5	mean_score.math	25	1.00	4.00	2.6350	.57159
		ALD_math	25	1	4	2.48	.653
		Valid N (listwise)	25				
	6	mean_score.math	14	1.88	3.50	2.4643	.53804
		ALD_math	14	2	4	2.64	.745
		Valid N (listwise)	14				

Appendix B: Results from District Flagging Business Rules Analysis

Gr	District	Subject	Which ALs	N	Pct AL1	Pct AL2	Pct AL3	Pct AL4	No Variance				Reduced			Bimodal			Decision	
									All_1	All_2	All_3	All_4	All_12	All_23	All_34	All_13	All_14	All_24		
5	Amherst	ELA	1111	145	4%	24%	52%	20%	0	0	0	0	0	0	0	0	0	0	0	
6	Amherst	ELA	1111	143	6%	25%	62%	8%	0	0	0	0	0	0	0	0	0	0	0	
7	Amherst	ELA	1111	157	1%	26%	53%	20%	0	0	0	0	0	0	0	0	0	0	0	
5	Amherst	Math	1111	151	6%	25%	45%	24%	0	0	0	0	0	0	0	0	0	0	0	
6	Amherst	Math	1111	142	6%	24%	49%	21%	0	0	0	0	0	0	0	0	0	0	0	
7	Amherst	Math	1111	160	3%	15%	56%	26%	0	0	0	0	0	0	0	0	0	0	0	
4	Bath	ELA	0111	12	0%	17%	50%	33%	0	0	0	0	0	0	0	0	0	0	0	
6	Bath	ELA	0110	8	0%	38%	63%	0%	0	0	0	0	0	1	0	0	0	0	0	Do not follow up: small sample size
3	Bath	Math	0110	11	0%	18%	82%	0%	0	0	0	0	0	1	0	0	0	0	0	Do not follow up: small sample size
6	Bath	Math	0111	8	0%	25%	50%	25%	0	0	0	0	0	0	0	0	0	0	0	
4	Bethlehem	ELA	0111	15	0%	27%	53%	20%	0	0	0	0	0	0	0	0	0	0	0	
5	Bethlehem	ELA	1111	25	4%	44%	40%	12%	0	0	0	0	0	0	0	0	0	0	0	
6	Bethlehem	ELA	0111	15	0%	33%	60%	7%	0	0	0	0	0	0	0	0	0	0	0	
3	Bethlehem	Math	0111	14	0%	21%	36%	43%	0	0	0	0	0	0	0	0	0	0	0	
5	Bethlehem	Math	1111	25	4%	48%	44%	4%	0	0	0	0	0	0	0	0	0	0	0	

6	Bethlehem	Math	0111	14	0%	50%	36%	14%	0	0	0	0	0	0	0	0	0	0
4	Concord	ELA	1111	308	9%	32%	52%	6%	0	0	0	0	0	0	0	0	0	0
5	Concord	ELA	1111	320	11%	25%	56%	8%	0	0	0	0	0	0	0	0	0	0
6	Concord	ELA	1111	322	8%	35%	45%	12%	0	0	0	0	0	0	0	0	0	0
7	Concord	ELA	1111	311	13%	33%	37%	16%	0	0	0	0	0	0	0	0	0	0
3	Concord	Math	1111	291	14%	31%	47%	8%	0	0	0	0	0	0	0	0	0	0
5	Concord	Math	1111	319	11%	28%	50%	11%	0	0	0	0	0	0	0	0	0	0
6	Concord	Math	1111	320	20%	38%	36%	5%	0	0	0	0	0	0	0	0	0	0
7	Concord	Math	1111	316	26%	39%	25%	10%	0	0	0	0	0	0	0	0	0	0
4	Conway	ELA	1111	36	11%	25%	61%	3%	0	0	0	0	0	0	0	0	0	0
5	Conway	ELA	1111	41	22%	37%	37%	5%	0	0	0	0	0	0	0	0	0	0
6	Conway	ELA	1111	42	10%	29%	60%	2%	0	0	0	0	0	0	0	0	0	0
3	Conway	Math	1110	39	8%	23%	69%	0%	0	0	0	0	0	0	0	0	0	0
5	Conway	Math	1111	41	5%	37%	54%	5%	0	0	0	0	0	0	0	0	0	0
6	Conway	Math	1110	42	7%	31%	62%	0%	0	0	0	0	0	0	0	0	0	0
4	Epping	ELA	1111	68	3%	38%	50%	9%	0	0	0	0	0	0	0	0	0	0
5	Epping	ELA	1110	63	25%	43%	32%	0%	0	0	0	0	0	0	0	0	0	0
6	Epping	ELA	1111	75	9%	43%	41%	7%	0	0	0	0	0	0	0	0	0	0
7	Epping	ELA	1111	66	11%	47%	36%	6%	0	0	0	0	0	0	0	0	0	0
3	Epping	Math	1111	77	1%	29%	66%	4%	0	0	0	0	0	0	0	0	0	0
5	Epping	Math	1111	63	10%	30%	46%	14%	0	0	0	0	0	0	0	0	0	0
6	Epping	Math	1111	75	12%	27%	40%	21%	0	0	0	0	0	0	0	0	0	0
7	Epping	Math	1111	66	17%	39%	30%	14%	0	0	0	0	0	0	0	0	0	0
4	Haverhill Cooperative	ELA	1111	49	22%	20%	51%	6%	0	0	0	0	0	0	0	0	0	0

5	Haverhill Cooperative	ELA	1111	39	8%	46%	38%	8%	0	0	0	0	0	0	0	0	0	0	Do not follow up: small sample size
6	Haverhill Cooperative	ELA	1111	59	10%	25%	56%	8%	0	0	0	0	0	0	0	0	0	0	
7	Haverhill Cooperative	ELA	1111	55	4%	51%	36%	9%	0	0	0	0	0	0	0	0	0		
3	Haverhill Cooperative	Math	1111	43	14%	35%	33%	19%	0	0	0	0	0	0	0	0	0		
5	Haverhill Cooperative	Math	1111	39	13%	44%	41%	3%	0	0	0	0	0	0	0	0	0		
6	Haverhill Cooperative	Math	1111	59	20%	37%	36%	7%	0	0	0	0	0	0	0	0	0		
4	Laconia	ELA	1110	146	16%	49%	34%	0%	0	0	0	0	0	0	0	0	0		
5	Laconia	ELA	1111	160	7%	44%	48%	2%	0	0	0	0	0	0	0	0	0		
3	Laconia	Math	1111	149	13%	49%	30%	8%	0	0	0	0	0	0	0	0	0		
5	Laconia	Math	1111	160	16%	41%	41%	1%	0	0	0	0	0	0	0	0	0		
4	Monroe	ELA	0110	4	0%	50%	50%	0%	0	0	0	0	0	1	0	0	0	0	Do not follow up: small sample size
5	Monroe	ELA	0110	6	0%	50%	50%	0%	0	0	0	0	0	1	0	0	0	0	Do not follow up: small sample size
6	Monroe	ELA	0111	6	0%	17%	67%	17%	0	0	0	0	0	0	0	0	0	0	
7	Monroe	ELA	1111	8	38%	25%	25%	13%	0	0	0	0	0	0	0	0	0	0	
3	Monroe	Math	0111	11	0%	45%	36%	18%	0	0	0	0	0	0	0	0	0	0	
5	Monroe	Math	0110	6	0%	17%	83%	0%	0	0	0	0	0	1	0	0	0	0	Do not follow up: small

6	Monroe	Math	0011	6	0%	0%	83%	17%	0	0	0	0	0	0	1	0	0	0	sample size Do not follow up: small sample size
7	Monroe	Math	1111	8	13%	38%	38%	13%	0	0	0	0	0	0	0	0	0	0	
4	Newport	ELA	1111	66	18%	39%	41%	2%	0	0	0	0	0	0	0	0	0	0	
5	Newport	ELA	1111	88	23%	41%	32%	5%	0	0	0	0	0	0	0	0	0	0	
6	Newport	ELA	1111	63	11%	38%	46%	5%	0	0	0	0	0	0	0	0	0	0	
7	Newport	ELA	1111	66	17%	42%	39%	2%	0	0	0	0	0	0	0	0	0	0	
3	Newport	Math	1111	55	25%	22%	47%	5%	0	0	0	0	0	0	0	0	0	0	
5	Newport	Math	1111	88	23%	61%	11%	5%	0	0	0	0	0	0	0	0	0	0	
6	Newport	Math	1111	62	26%	48%	23%	3%	0	0	0	0	0	0	0	0	0	0	
7	Newport	Math	1111	66	20%	47%	27%	6%	0	0	0	0	0	0	0	0	0	0	
4	Piermont	ELA	0011	4	0%	0%	50%	50%	0	0	0	0	0	0	1	0	0	0	Do not follow up: small sample size
5	Piermont	ELA	0010	3	0%	0%	100%	0%	0	0	1	0	0	0	0	0	0	0	Do not follow up: small sample size
6	Piermont	ELA	0111	12	0%	50%	25%	25%	0	0	0	0	0	0	0	0	0	0	
7	Piermont	ELA	0110	10	0%	10%	90%	0%	0	0	0	0	0	1	0	0	0	0	Do not follow up: small sample size

3	Piermont	Math	0110	8	0%	13%	88%	0%	0	0	0	0	0	1	0	0	0	0	Do not follow up: small sample size
5	Piermont	Math	0111	3	0%	33%	33%	33%	0	0	0	0	0	0	0	0	0	0	
6	Piermont	Math	0111	12	0%	42%	50%	8%	0	0	0	0	0	0	0	0	0	0	
7	Piermont	Math	0110	5	0%	40%	60%	0%	0	0	0	0	0	1	0	0	0	0	Do not follow up: small sample size
4	Rochester	ELA	1111	301	7%	32%	47%	15%	0	0	0	0	0	0	0	0	0	0	
5	Rochester	ELA	1111	284	11%	33%	38%	18%	0	0	0	0	0	0	0	0	0	0	
6	Rochester	ELA	1111	299	13%	37%	34%	15%	0	0	0	0	0	0	0	0	0	0	
7	Rochester	ELA	1111	314	17%	44%	30%	9%	0	0	0	0	0	0	0	0	0	0	
3	Rochester	Math	1111	268	15%	24%	44%	17%	0	0	0	0	0	0	0	0	0	0	
5	Rochester	Math	1111	284	13%	29%	40%	18%	0	0	0	0	0	0	0	0	0	0	
6	Rochester	Math	1111	302	28%	38%	29%	5%	0	0	0	0	0	0	0	0	0	0	
7	Rochester	Math	1111	315	12%	36%	43%	8%	0	0	0	0	0	0	0	0	0	0	
4	Sanborn Regional	ELA	1111	107	10%	43%	43%	4%	0	0	0	0	0	0	0	0	0	0	
5	Sanborn Regional	ELA	1111	103	4%	40%	50%	7%	0	0	0	0	0	0	0	0	0	0	
6	Sanborn Regional	ELA	1111	98	15%	27%	53%	5%	0	0	0	0	0	0	0	0	0	0	
7	Sanborn Regional	ELA	1111	115	3%	18%	44%	34%	0	0	0	0	0	0	0	0	0	0	
3	Sanborn Regional	Math	1111	74	1%	32%	55%	11%	0	0	0	0	0	0	0	0	0	0	

5	Sanborn Regional	Math	1111	103	6%	43%	39%	13%	0	0	0	0	0	0	0	0	0	0	Do not follow up: checked Gr 8 ELA results for NH SAS 2018; 74% of student proficient or above which is similar to this though different students
6	Sanborn Regional	Math	1111	98	9%	33%	38%	20%	0	0	0	0	0	0	0	0	0	0	
7	Sanborn Regional	Math	1111	115	8%	29%	45%	18%	0	0	0	0	0	0	0	0	0	0	
4	Seacoast Charter School	ELA	1111	28	14%	32%	50%	4%	0	0	0	0	0	0	0	0	0	0	
5	Seacoast Charter School	ELA	1110	31	6%	65%	29%	0%	0	0	0	0	0	0	0	0	0	0	
6	Seacoast Charter School	ELA	1111	27	15%	26%	48%	11%	0	0	0	0	0	0	0	0	0	0	
7	Seacoast Charter School	ELA	0110	26	0%	27%	73%	0%	0	0	0	0	0	1	0	0	0	0	

3	Seacoast Charter School	Math	1111	32	16%	31%	31%	22%	0	0	0	0	0	0	0	0	0	0	Do not follow up: small sample size
5	Seacoast Charter School	Math	1111	31	3%	48%	45%	3%	0	0	0	0	0	0	0	0	0	0	
6	Seacoast Charter School	Math	1111	28	14%	36%	29%	21%	0	0	0	0	0	0	0	0	0	0	
7	Seacoast Charter School	Math	1111	26	4%	31%	50%	15%	0	0	0	0	0	0	0	0	0	0	
4	Warren	ELA	0110	8	0%	50%	50%	0%	0	0	0	0	0	1	0	0	0	0	
5	Warren	ELA	1111	9	22%	22%	44%	11%	0	0	0	0	0	0	0	0	0	0	
6	Warren	ELA	0110	9	0%	56%	44%	0%	0	0	0	0	0	1	0	0	0	0	
7	Warren	ELA	0111	8	0%	25%	50%	25%	0	0	0	0	0	0	0	0	0	0	
3	Warren	Math	0110	11	0%	18%	82%	0%	0	0	0	0	0	1	0	0	0	0	
5	Warren	Math	1110	9	22%	56%	22%	0%	0	0	0	0	0	0	0	0	0	0	
6	Warren	Math	0111	9	0%	33%	56%	11%	0	0	0	0	0	0	0	0	0	0	
7	Warren	Math	1111	9	22%	22%	33%	22%	0	0	0	0	0	0	0	0	0	0	

Appendix C: Application of Cut Score Calculation Business Rules in 2018-19 by District, Grade, and Subject

Scale.ID	Cut12	Cut23	Cut34	Result12	Result23	Result34
2019 Amherst PACE Grade 5 ELA	2.10	2.73	3.21	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Amherst PACE Grade 5 Math	2.14	2.71	3.20	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Amherst PACE Grade 6 ELA	1.81	2.50	3.62	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Amherst PACE Grade 6 Math	1.61	2.62	3.30	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Amherst PACE Grade 7 ELA	1.56	2.66	3.29	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Amherst PACE Grade 7 Math	2.02	2.59	3.16	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Amherst PACE Grade 8 Science	1.88	2.67	3.58	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Concord PACE Grade 3 Math	1.91	2.68	3.47	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Concord PACE Grade 4 ELA	1.89	2.72	3.94	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Concord PACE Grade 5 ELA	1.79	2.67	3.55	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Concord PACE Grade 5 Math	1.85	2.68	3.42	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Concord PACE Grade 6 ELA	1.53	2.66	3.62	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Concord PACE Grade 6 Math	1.91	2.87	3.66	< estimated successfully >	< estimated successfully >	< estimated successfully >

2019 Concord PACE Grade 7 ELA	1.75	2.90	3.86	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Concord PACE Grade 7 Math	1.88	3.11	3.92	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Concord PACE Grade 8 Science	1.69	2.58	3.66	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Conway PACE Grade 3 Math	1.70	2.40	3.20	< set via step 2 rule after > < estimation failed to converge >	< estimated successfully >	< set via step 1 rule >
2019 Conway PACE Grade 4 ELA	1.75	2.50	4.00	< set via step 2 rule after > < estimation failed to converge >	< set via step 2 rule after > < estimation failed to converge >	< set via step 2 rule after > < estimation failed to converge >
2019 Conway PACE Grade 5 ELA	2.09	2.88	3.62	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Conway PACE Grade 5 Math	1.68	2.80	3.76	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Conway PACE Grade 6 ELA	1.89	2.67	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation failed to converge >
2019 Conway PACE Grade 6 Math	2.11	2.89	3.44	< estimated successfully >	< estimated successfully >	< set via step 1 rule >
2019 Epping PACE Grade 3 Math	1.77	2.54	4.00	< set via step 2 rule after > < estimation failed to converge >	< estimated successfully >	< set via step 2 rule after > < estimation failed to converge >
2019 Epping PACE Grade 4 ELA	1.53	2.63	3.53	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Epping PACE Grade 5 ELA	1.73	2.80	3.40	< estimated successfully >	< estimated successfully >	< set via step 1 rule >
2019 Epping PACE Grade 5 Math	1.81	2.72	3.42	< estimated successfully >	< estimated successfully >	< estimated successfully >

2019 Epping PACE Grade 6 ELA	1.42	2.72	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation failed to converge >
2019 Epping PACE Grade 6 Math	1.71	2.60	3.36	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Epping PACE Grade 7 ELA	1.50	2.68	3.63	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Epping PACE Grade 7 Math	1.62	2.79	3.53	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Epping PACE Grade 8 Science	2.32	2.88	3.63	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Haverhill Cooperative PACE Grade 3 Math	1.75	2.72	3.62	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Haverhill Cooperative PACE Grade 4 ELA	1.69	2.44	3.11	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Haverhill Cooperative PACE Grade 5 ELA	1.98	2.43	3.28	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Haverhill Cooperative PACE Grade 5 Math	1.69	2.65	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation failed to converge >
2019 Haverhill Cooperative PACE Grade 6 ELA	1.61	2.54	3.68	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Haverhill Cooperative PACE Grade 6 Math	1.30	2.53	3.91	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Haverhill Cooperative PACE Grade 7 ELA	1.86	2.71	3.62	< set via step 2 rule after > < estimation failed to converge >	< estimated successfully >	< estimated successfully >
2019 Haverhill Cooperative PACE Grade 7 Math	1.38	2.69	4.00	< estimated successfully >	< set via step 2 rule after > < estimation failed to converge >	< set via step 2 rule after > < estimation failed to converge >

						predicted failure for all scores >
2019 Laconia PACE Grade 3 Math	1.59	2.62	3.41	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Laconia PACE Grade 4 ELA	1.64	2.58	3.29	< estimated successfully >	< estimated successfully >	< set via step 1 rule >
2019 Laconia PACE Grade 5 ELA	1.43	2.49	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation failed to converge >
2019 Laconia PACE Grade 5 Math	1.56	2.48	3.54	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Monroe PACE Grade 3 Math	1.95	2.90	3.00	< set via step 1 rule >	< estimated successfully >	< estimated successfully >
2019 Monroe PACE Grade 4 ELA	1.75	2.50	4.00	< set via step 2 rule >	< set via step 2 rule after > < finding fewer than 5 cases >	< set via step 2 rule >
2019 Monroe PACE Grade 5 ELA	2.00	3.00	3.50	< set via step 1 rule >	< estimated successfully >	< set via step 1 rule >
2019 Monroe PACE Grade 5 Math	1.75	2.49	3.25	< set via step 1 rule >	< estimated successfully >	< set via step 1 rule >
2019 Monroe PACE Grade 6 ELA	1.75	2.49	3.51	< set via step 1 rule >	< estimated successfully >	< estimated successfully >
2019 Monroe PACE Grade 6 Math	1.83	2.67	3.50	< set via step 1 rule >	< set via step 1 rule >	< estimated successfully >
2019 Monroe PACE Grade 7 ELA	2.74	2.99	3.04	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Monroe PACE Grade 7 Math	1.51	2.98	3.51	< estimated successfully >	< estimated successfully >	< estimated successfully >

2019 Monroe PACE Grade 8 Science	2.49	2.97	3.49	< estimated successfully >	< estimated successfully >	< set via step 1 rule >
2019 Newport PACE Grade 3 Math	1.34	2.24	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Newport PACE Grade 4 ELA	1.83	2.61	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Newport PACE Grade 5 ELA	1.88	2.74	3.55	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Newport PACE Grade 5 Math	1.73	3.08	3.80	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Newport PACE Grade 6 ELA	2.07	2.90	3.50	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Newport PACE Grade 6 Math	2.70	3.48	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Newport PACE Grade 7 ELA	1.13	2.32	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Newport PACE Grade 7 Math	1.34	2.39	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
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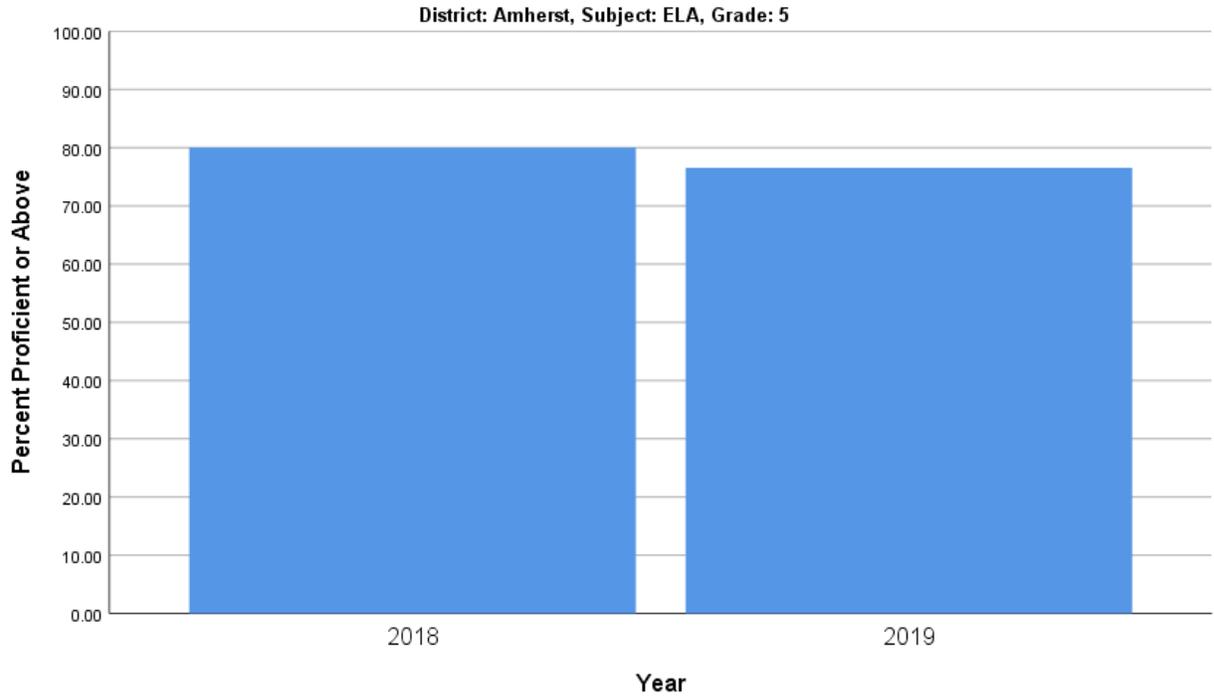
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2019 Rochester PACE Grade 4 ELA	2.35	3.10	3.86	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Rochester PACE Grade 5 ELA	2.31	3.16	3.85	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Rochester PACE Grade 5 Math	2.34	3.08	3.89	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Rochester PACE Grade 6 ELA	2.29	3.56	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Rochester PACE Grade 6 Math	2.67	3.48	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Rochester PACE Grade 7 ELA	2.76	3.60	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Rochester PACE Grade 7 Math	2.31	3.41	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Rochester PACE Grade 8 Science	1.47	2.98	3.98	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Sanborn Regional PACE Grade 3 Math	1.40	2.79	3.44	< set via step 2 rule after > < estimation failed to converge >	< estimated successfully >	< estimated successfully >
2019 Sanborn Regional PACE Grade 4 ELA	2.40	2.83	3.19	< estimated successfully >	< estimated successfully >	< estimated successfully >

2019 Sanborn Regional PACE Grade 5 ELA	1.76	2.75	3.67	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Sanborn Regional PACE Grade 5 Math	1.62	2.71	3.18	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Sanborn Regional PACE Grade 6 ELA	1.99	2.55	3.37	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Sanborn Regional PACE Grade 6 Math	1.94	2.79	3.41	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Sanborn Regional PACE Grade 7 ELA	1.87	2.64	3.23	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Sanborn Regional PACE Grade 7 Math	2.12	2.85	3.72	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Sanborn Regional PACE Grade 8 Science	1.54	2.55	3.44	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 SAU #35 Office PACE Grade 3 Math	1.92	2.84	3.74	< set via step 1 rule >	< estimated successfully >	< estimated successfully >
2019 SAU #35 Office PACE Grade 4 ELA	1.80	2.60	3.49	< set via step 1 rule >	< estimated successfully >	< estimated successfully >
2019 SAU #35 Office PACE Grade 5 ELA	1.91	2.82	4.00	< set via step 2 rule after > < estimation failed to converge >	< estimated successfully >	< set via step 2 rule after > < estimation failed to converge >
2019 SAU #35 Office PACE Grade 5 Math	1.75	2.50	4.00	< set via step 2 rule after > < estimation failed to converge >	< set via step 2 rule after > < estimation failed to converge >	< set via step 2 rule after > < estimation failed to converge >
2019 SAU #35 Office PACE Grade 6 ELA	1.80	2.60	4.00	< set via step 1 rule >	< estimated successfully >	< set via step 2 rule after > < estimation failed to converge >
2019 SAU #35 Office PACE Grade 6 Math	1.75	2.50	4.00	< set via step 2 rule >	< set via step 2 rule after > < estimation failed to converge >	< set via step 2 rule after > < estimation failed to converge >

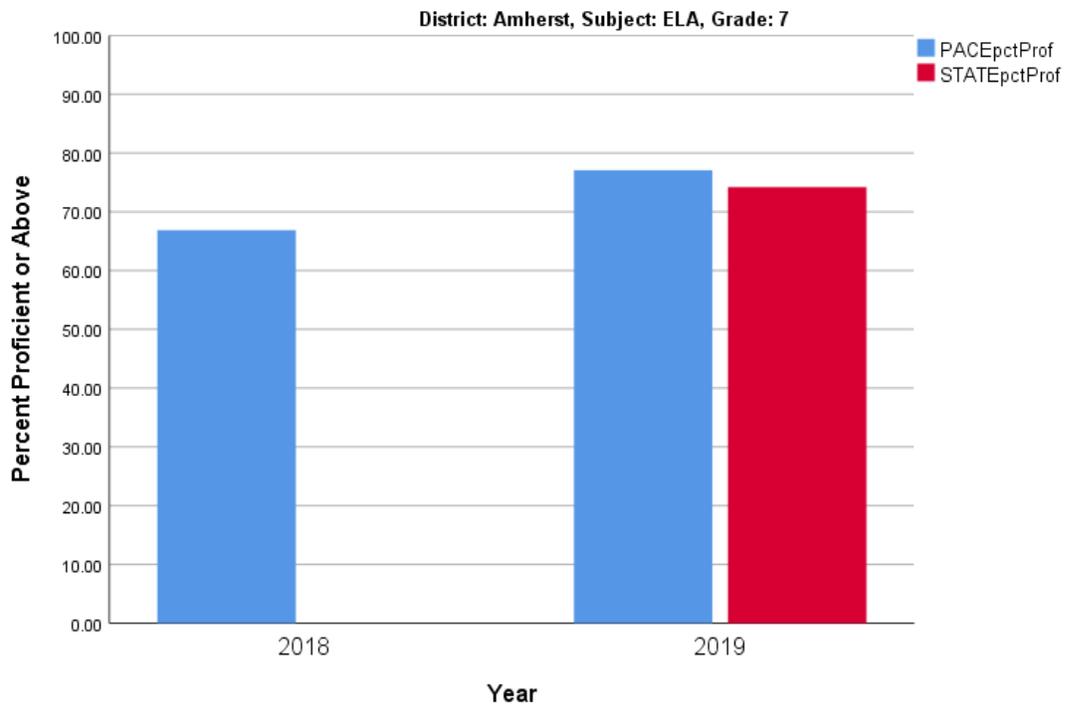
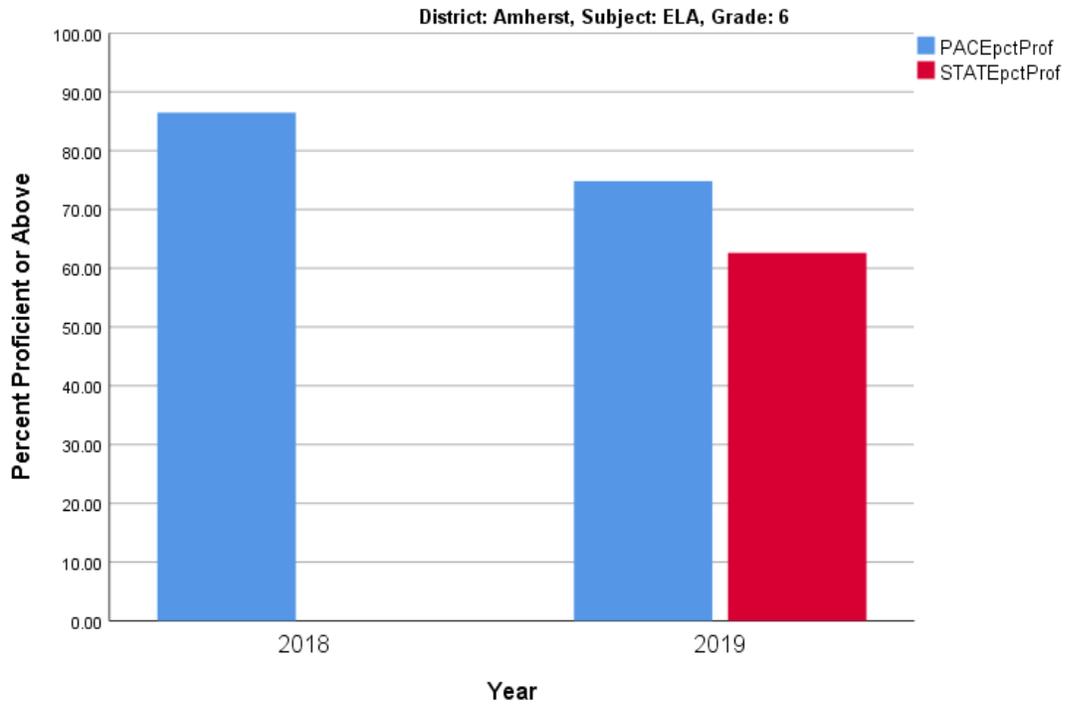
2019 Seacoast Charter School PACE Grade 3 Math	1.53	2.55	3.22	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Seacoast Charter School PACE Grade 4 ELA	1.69	2.79	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Seacoast Charter School PACE Grade 5 ELA	1.59	2.87	3.43	< estimated successfully >	< estimated successfully >	< set via step 1 rule >
2019 Seacoast Charter School PACE Grade 5 Math	2.00	3.00	4.00	< set via step 2 rule after > < estimation failed to converge >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Seacoast Charter School PACE Grade 6 ELA	2.07	2.78	4.00	< estimated successfully >	< estimated successfully >	< set via step 2 rule after > < estimation predicted failure for all scores >
2019 Seacoast Charter School PACE Grade 6 Math	1.89	2.65	3.20	< estimated successfully >	< estimated successfully >	< estimated successfully >
2019 Seacoast Charter School PACE Grade 7 ELA	1.51	2.02	3.01	< set via step 1 rule >	< estimated successfully >	< set via step 1 rule >
2019 Seacoast Charter School PACE Grade 7 Math	1.74	2.48	3.50	< set via step 2 rule after > < estimation failed to converge >	< estimated successfully >	< estimated successfully >
2019 Seacoast Charter School PACE Grade 8 Science	1.83	2.67	3.04	< set via step 1 rule >	< estimated successfully >	< estimated successfully >

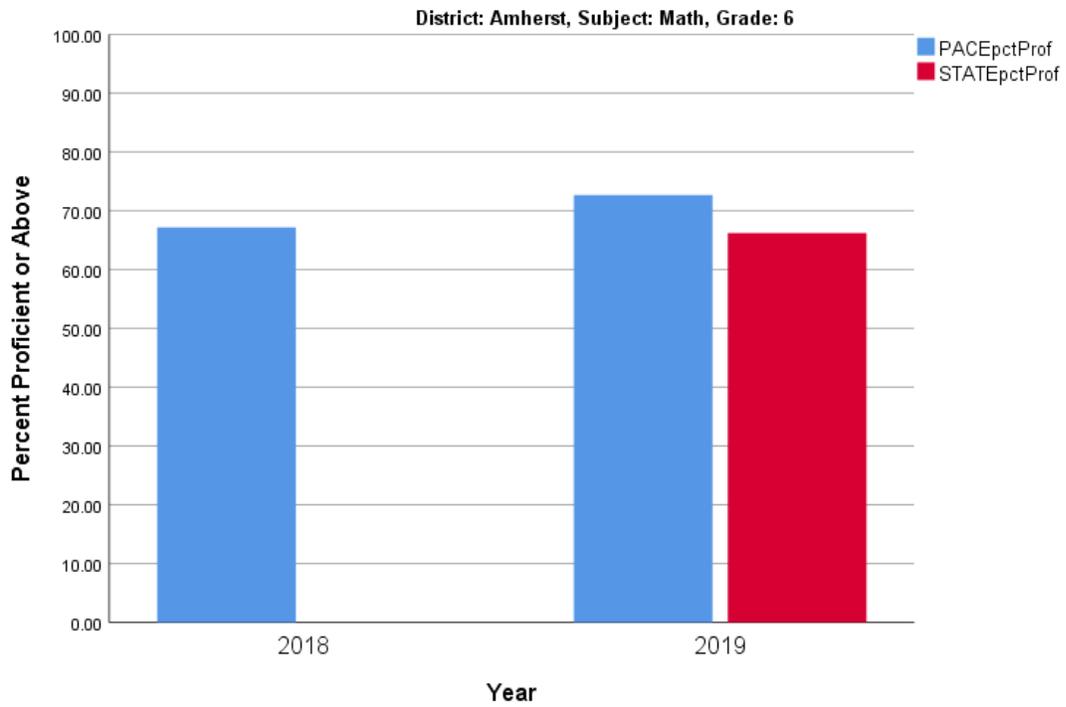
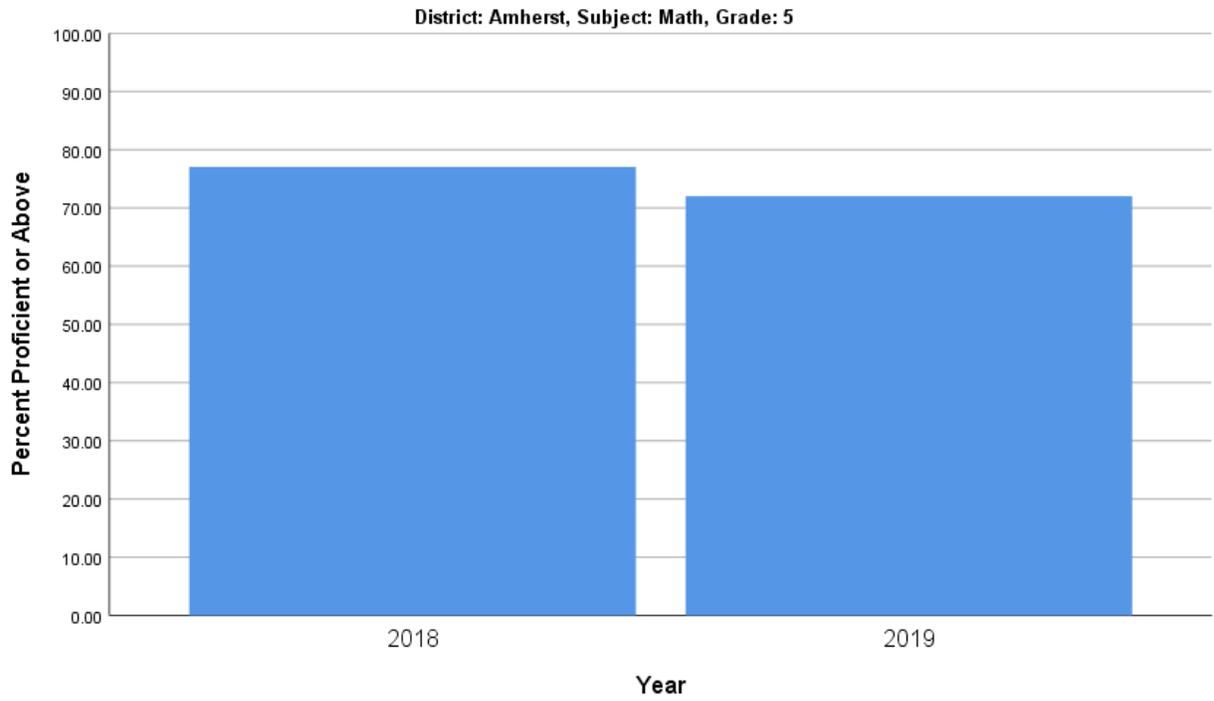
Appendix D: Impact Analyses by District⁴

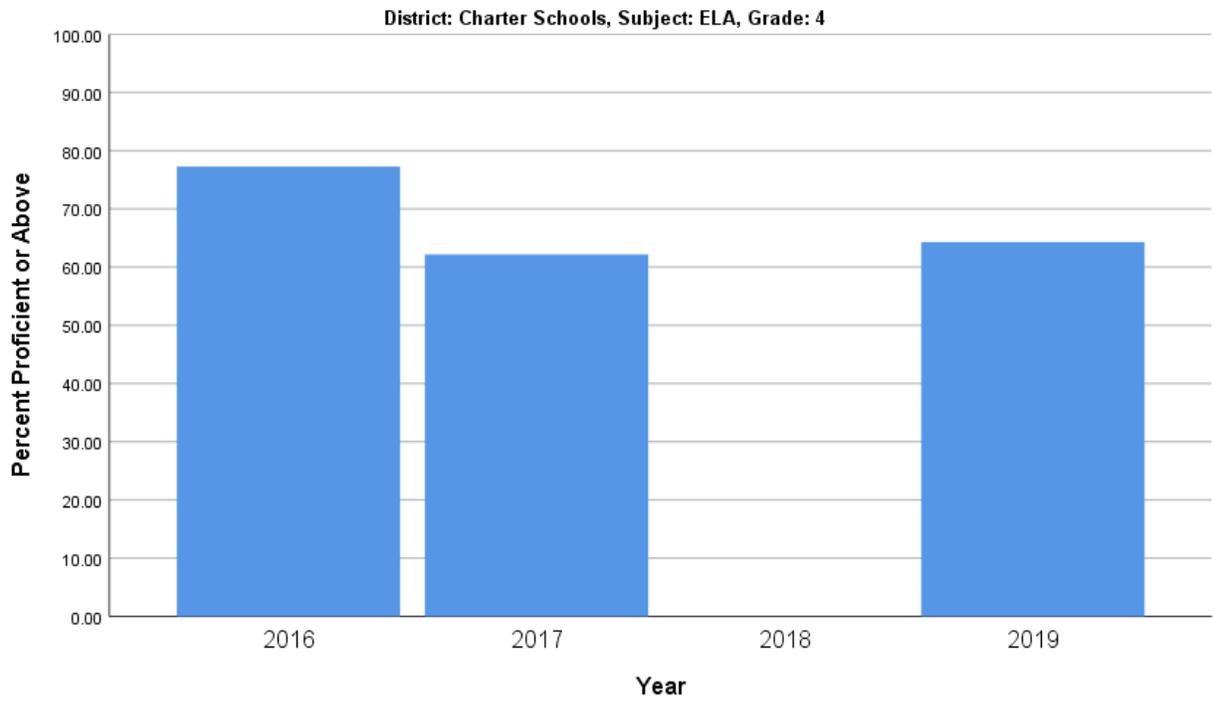
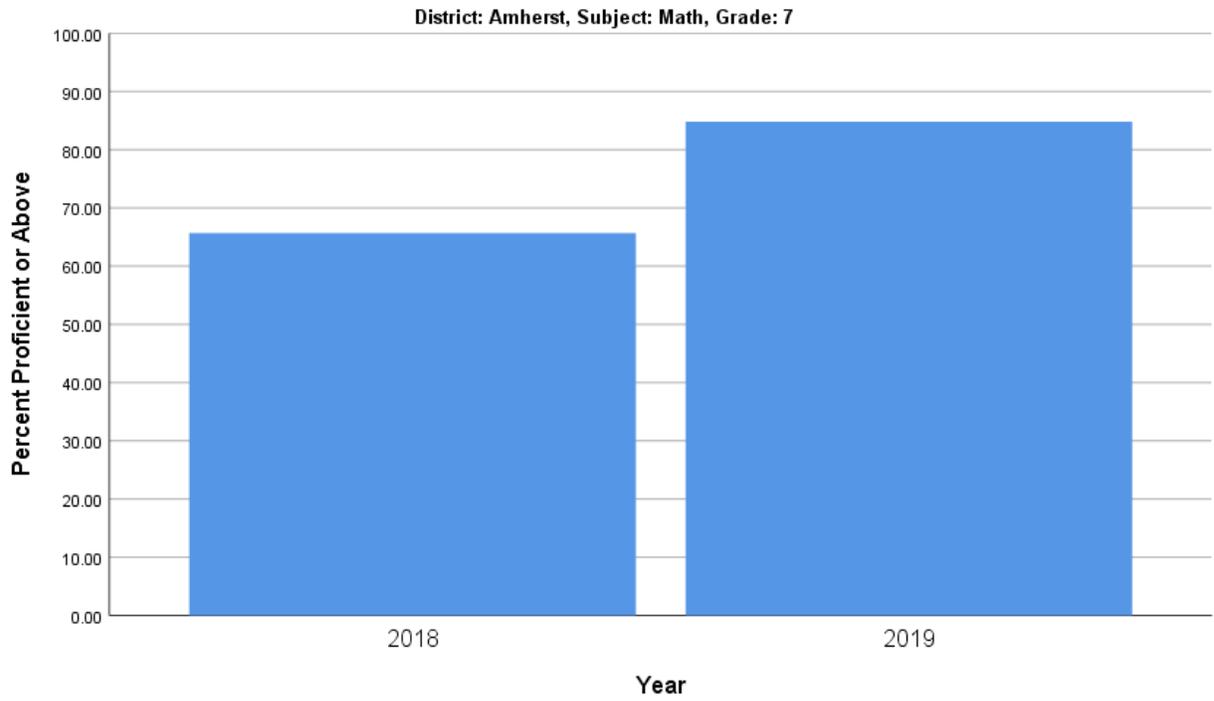
Cohort Analysis by District



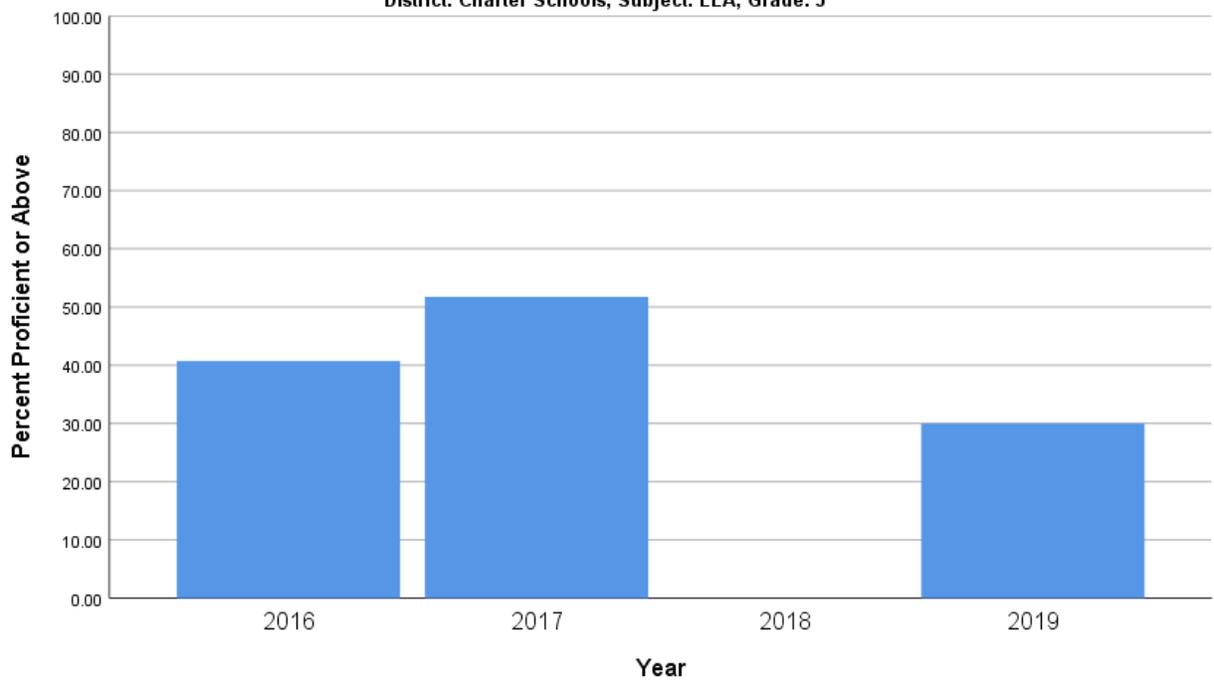
⁴ In the impact analyses by district, Charter Schools=Seacoast Charter School; SAU35 Office=Bethlehem.

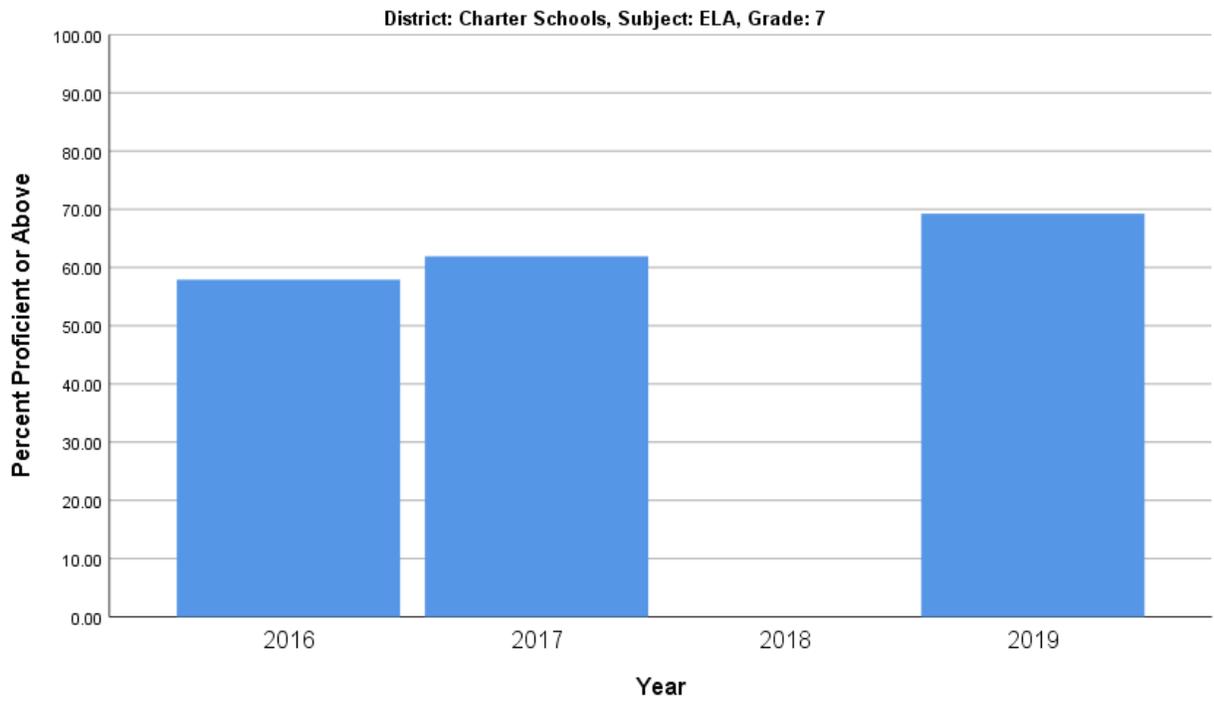
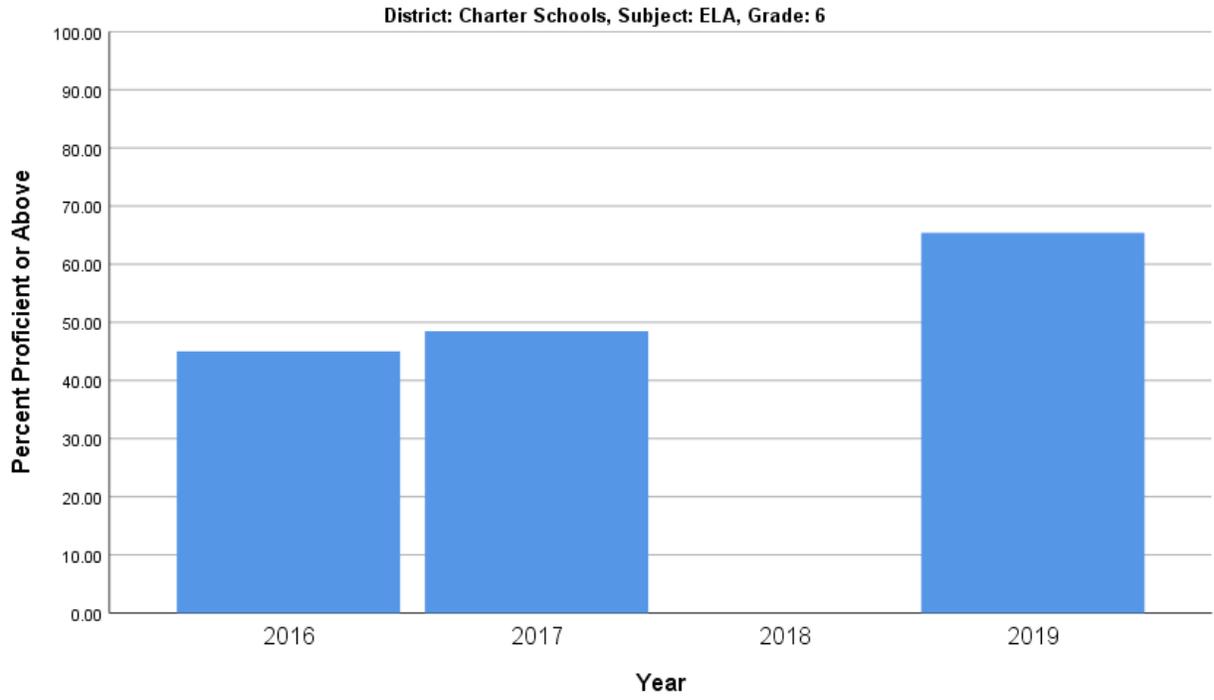


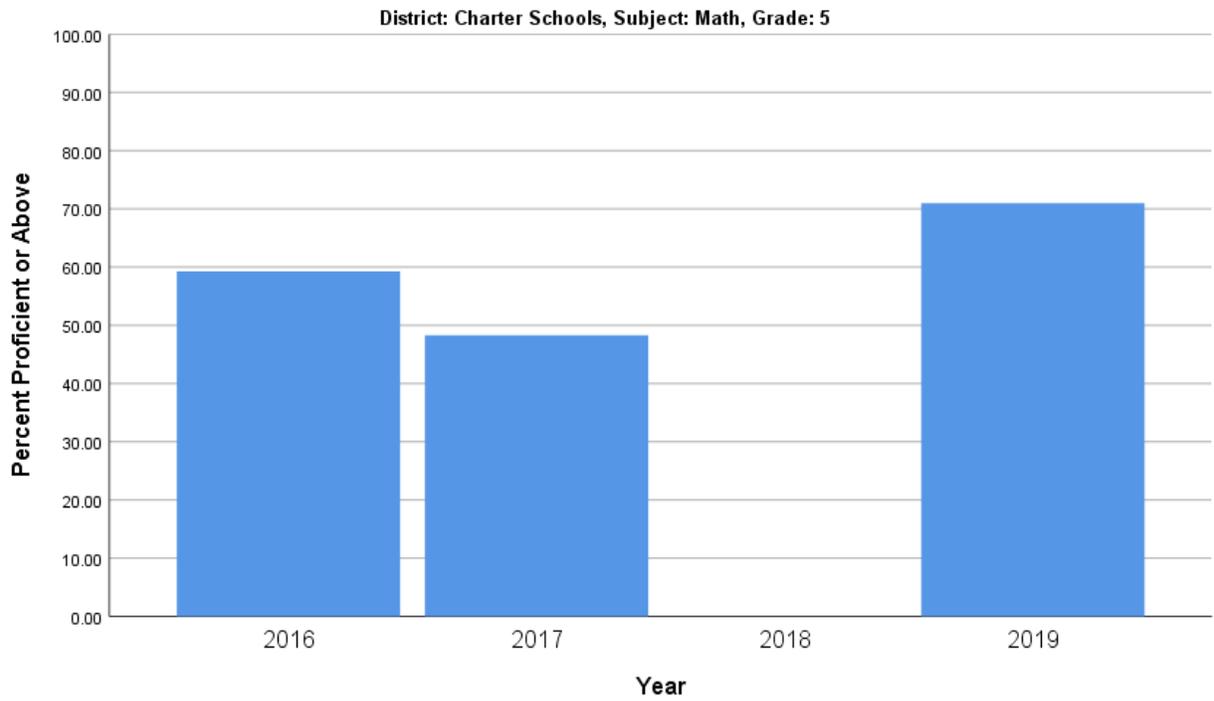
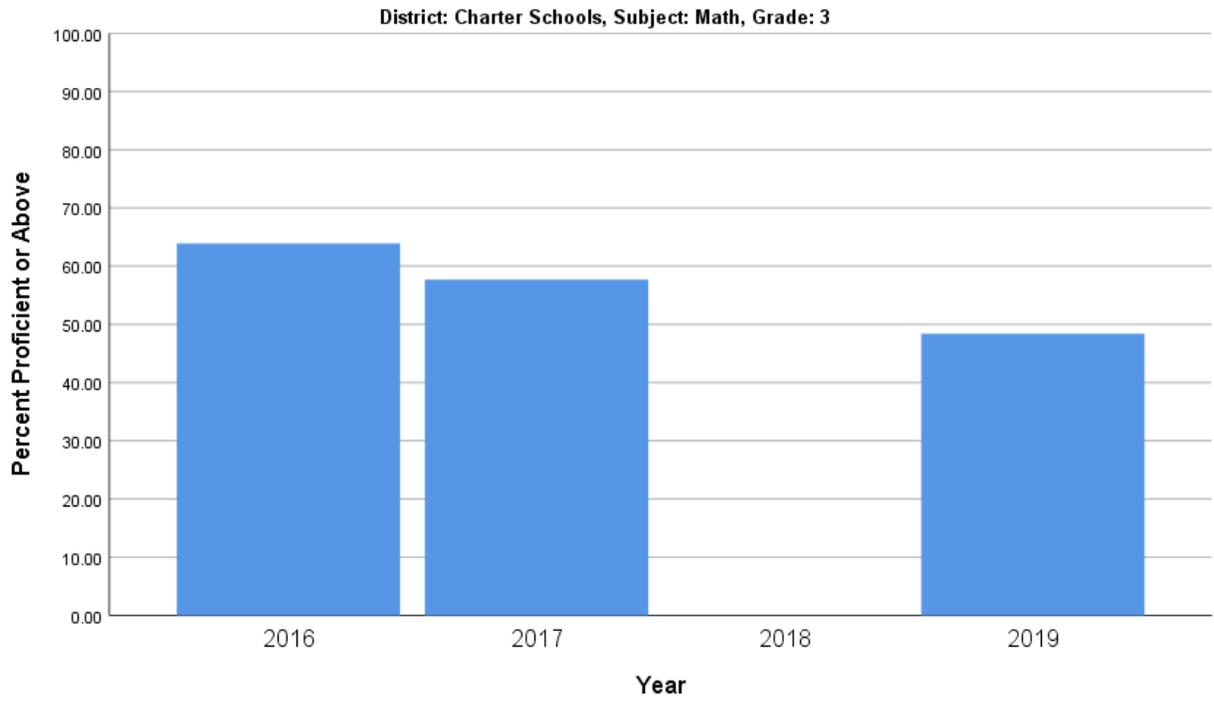




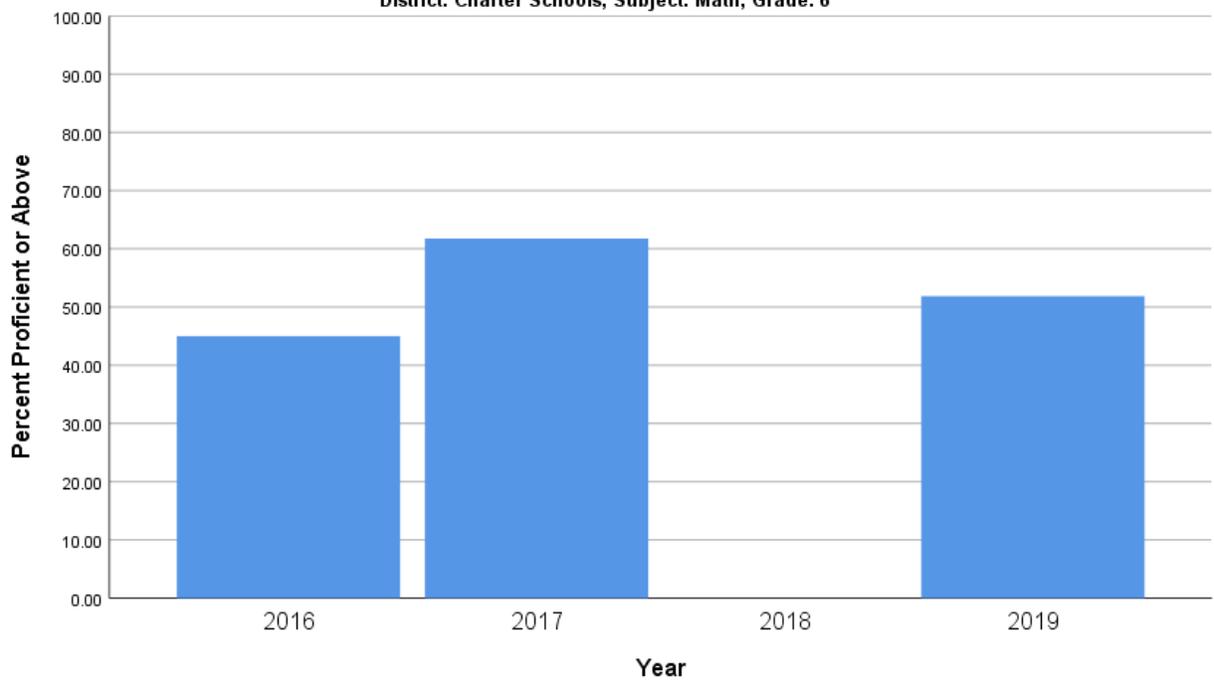
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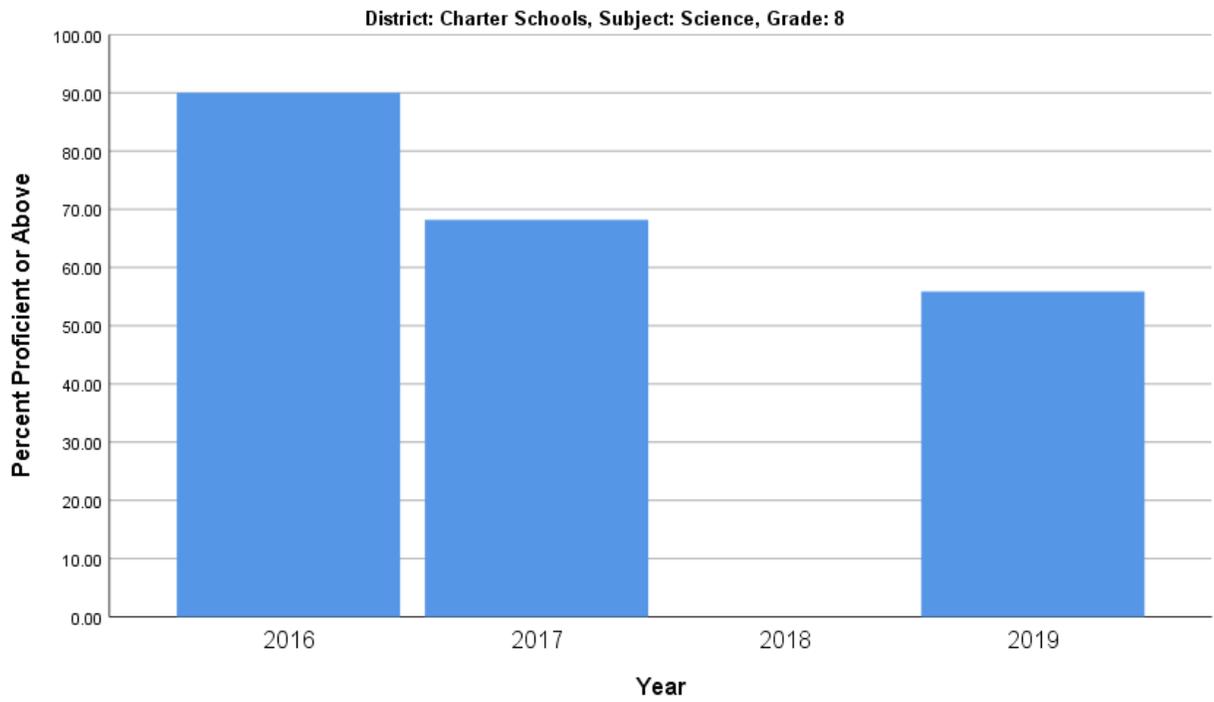
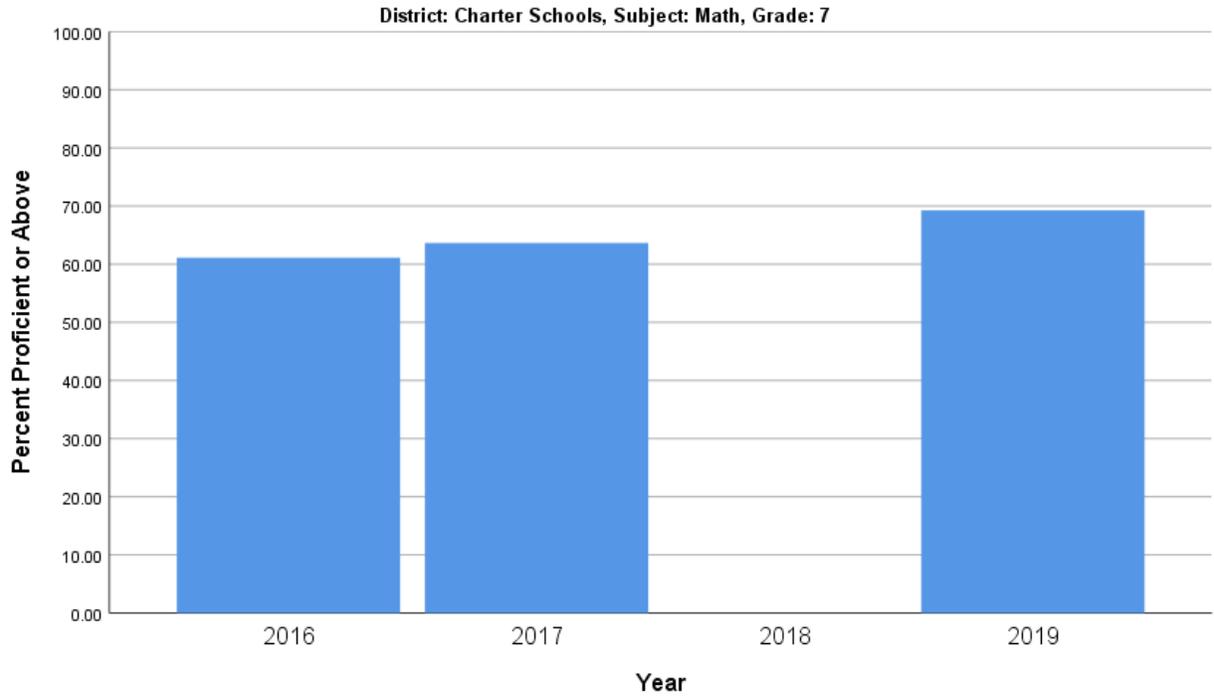


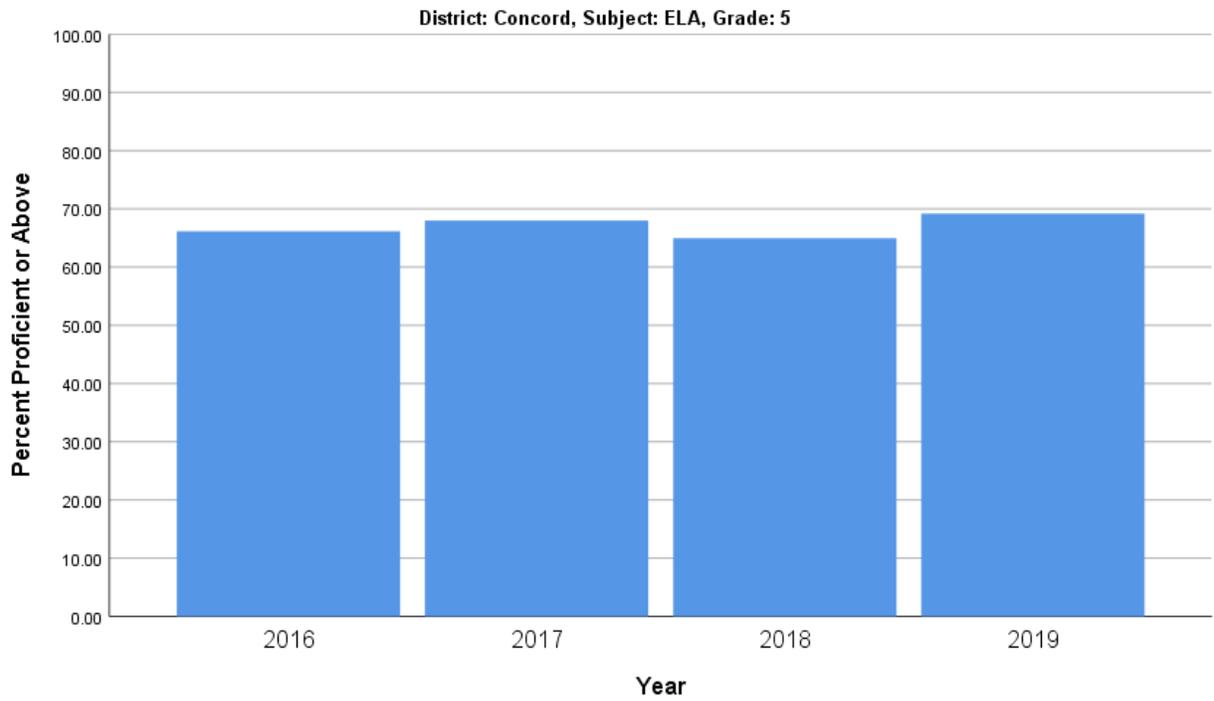
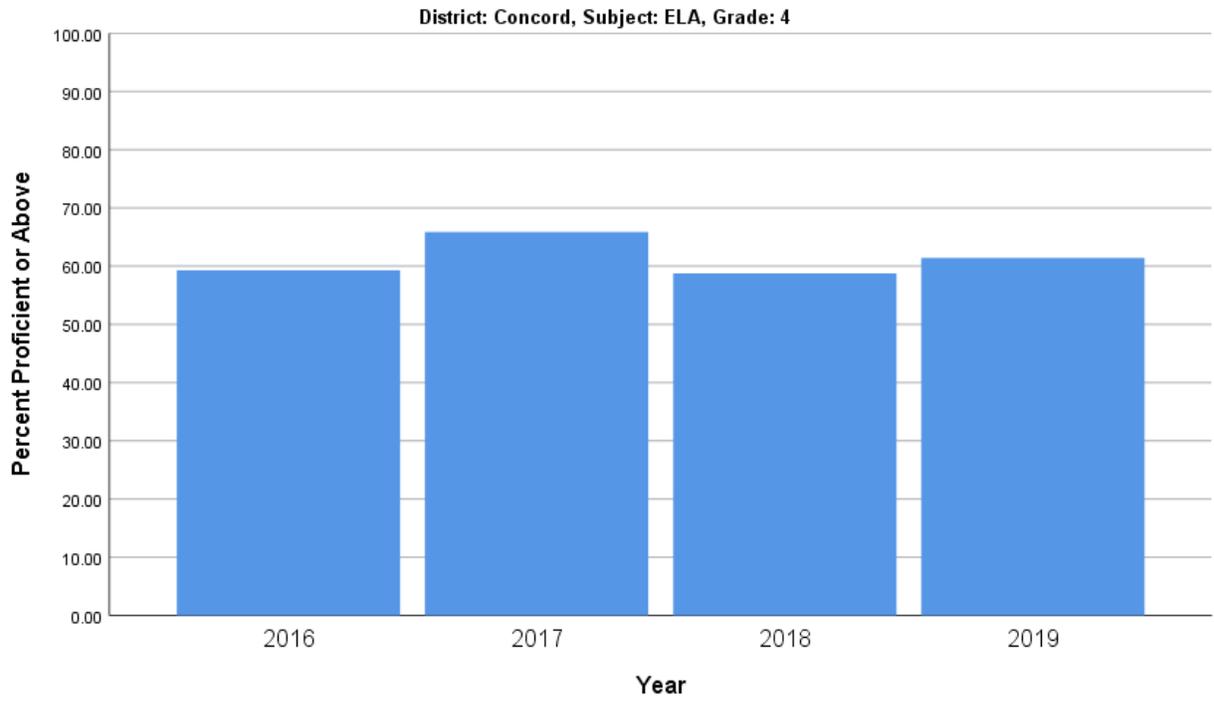




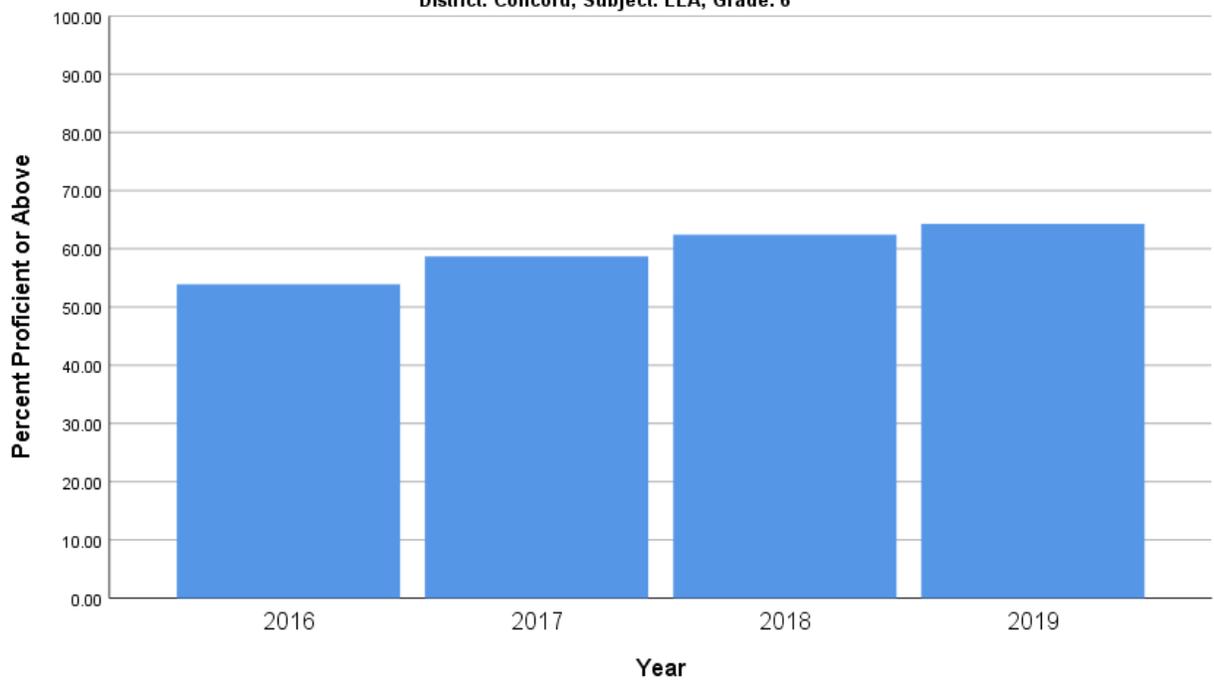
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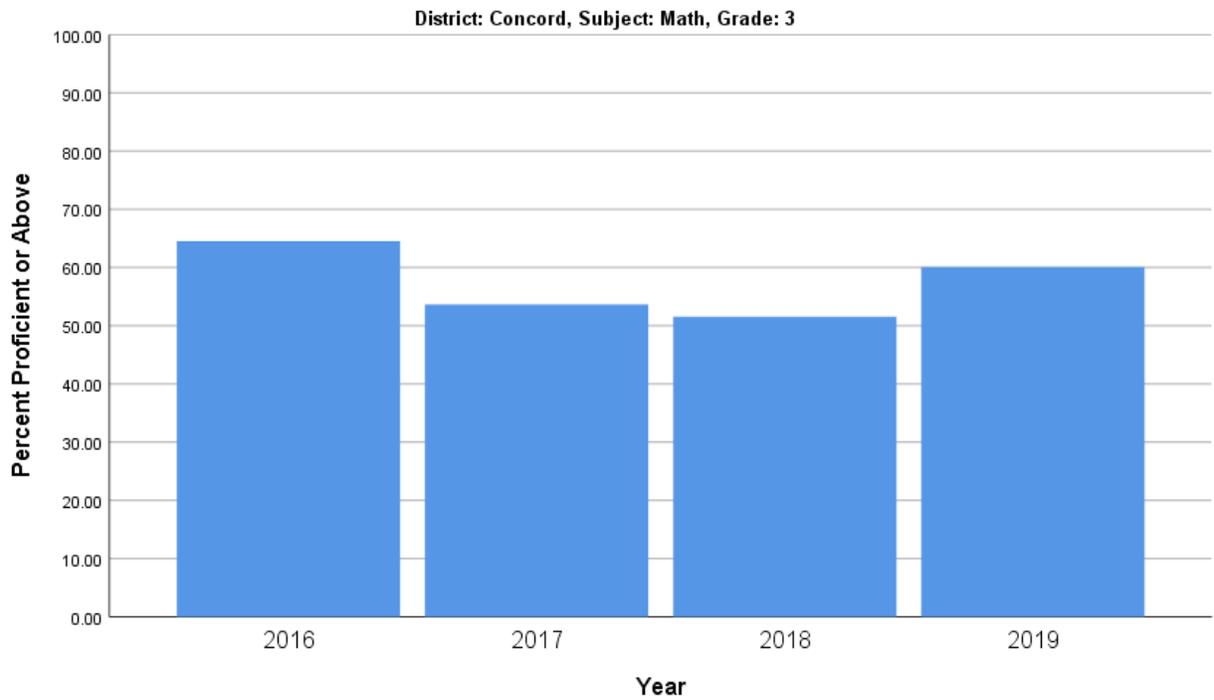
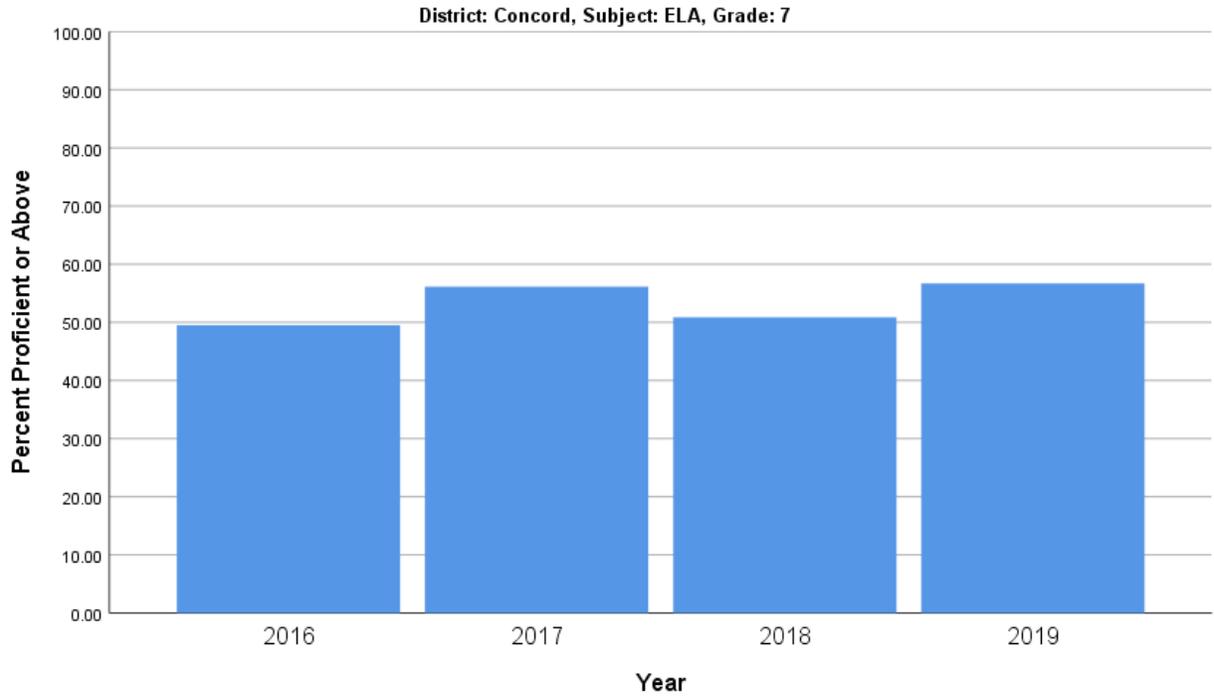


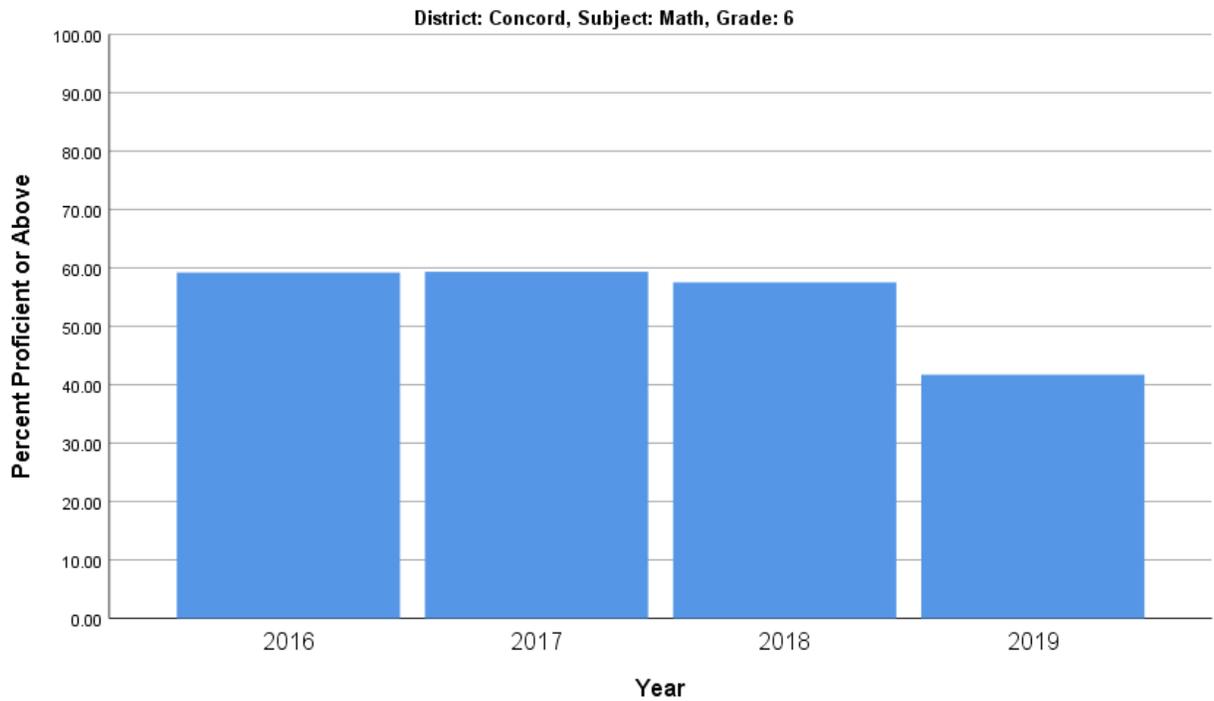
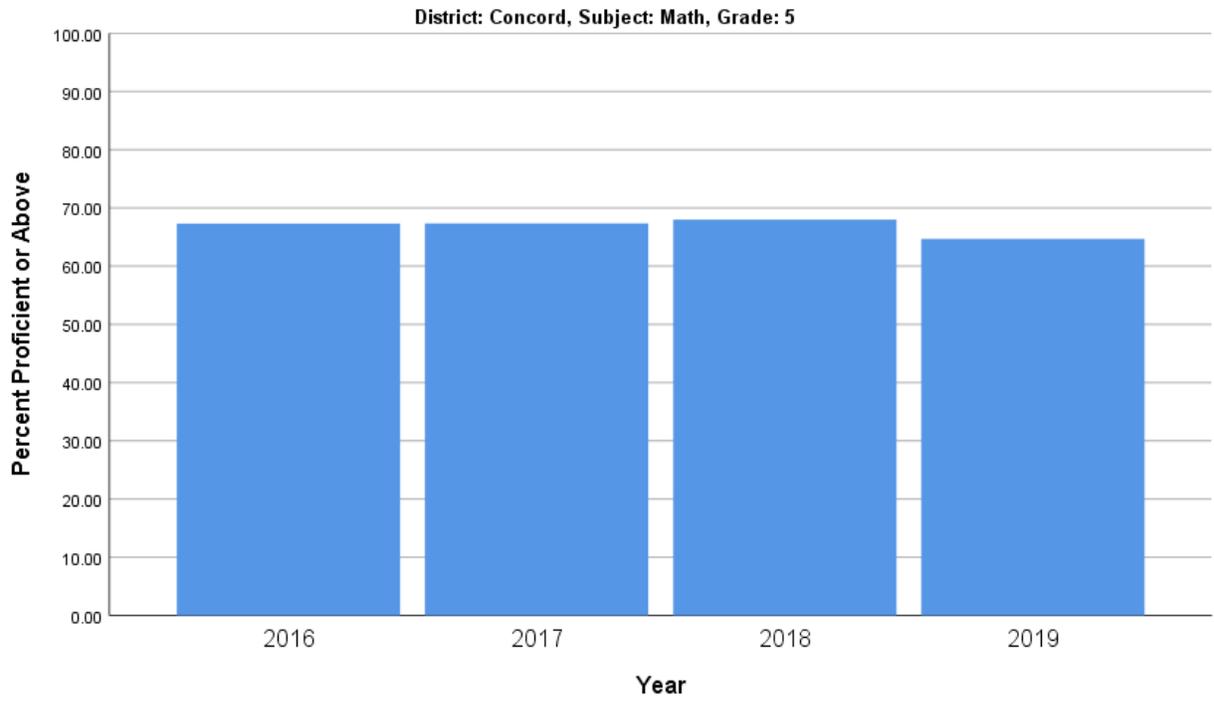




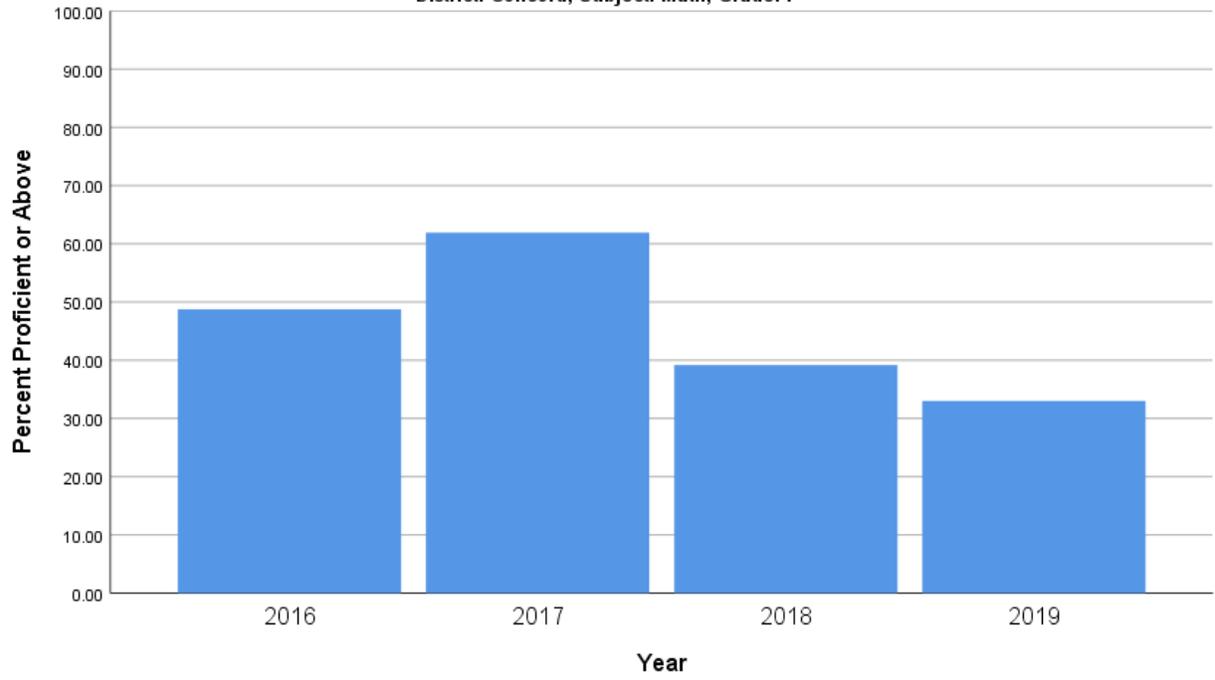
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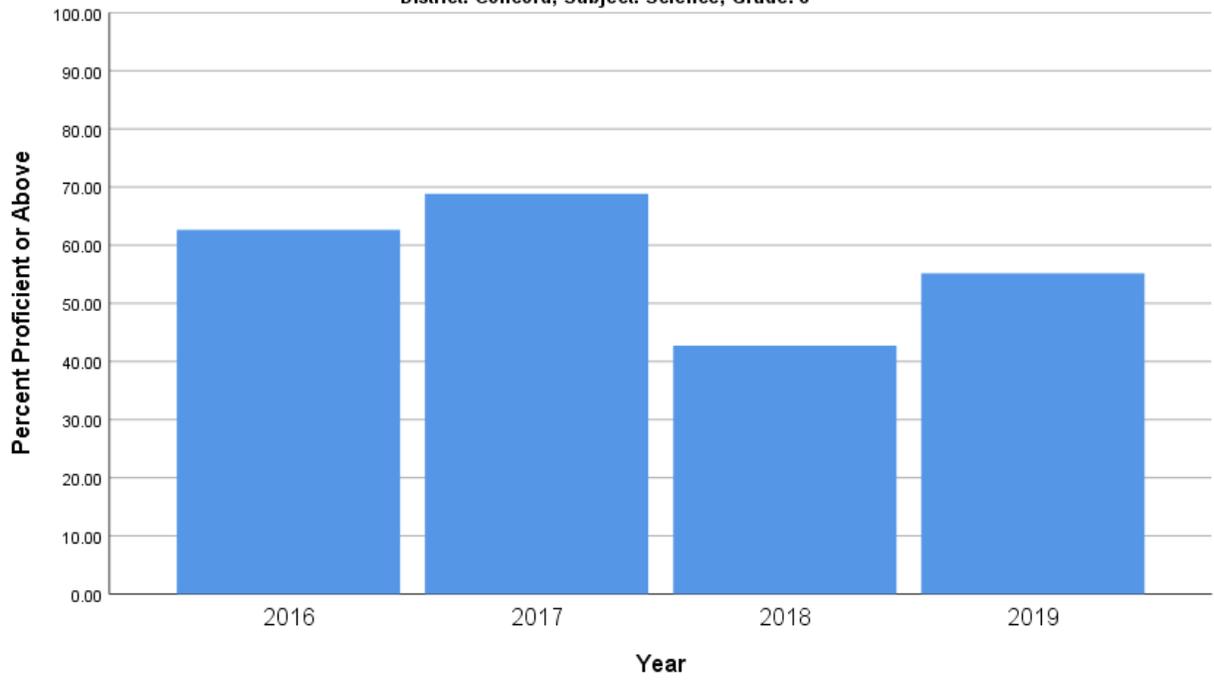




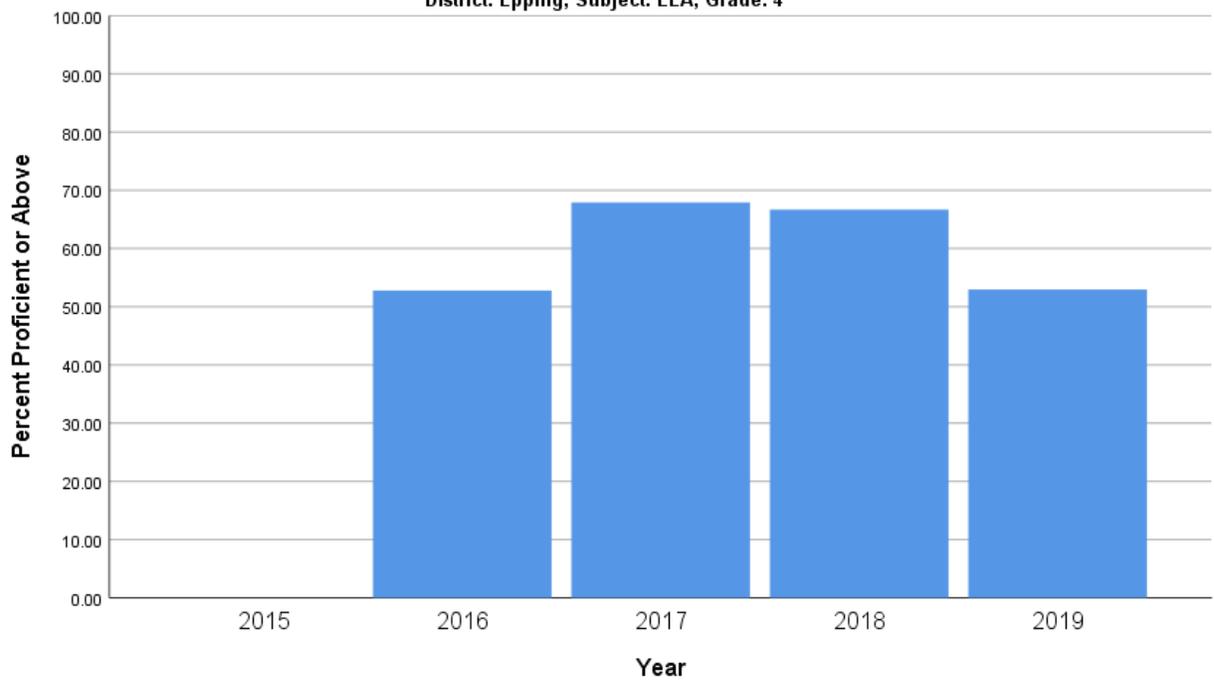
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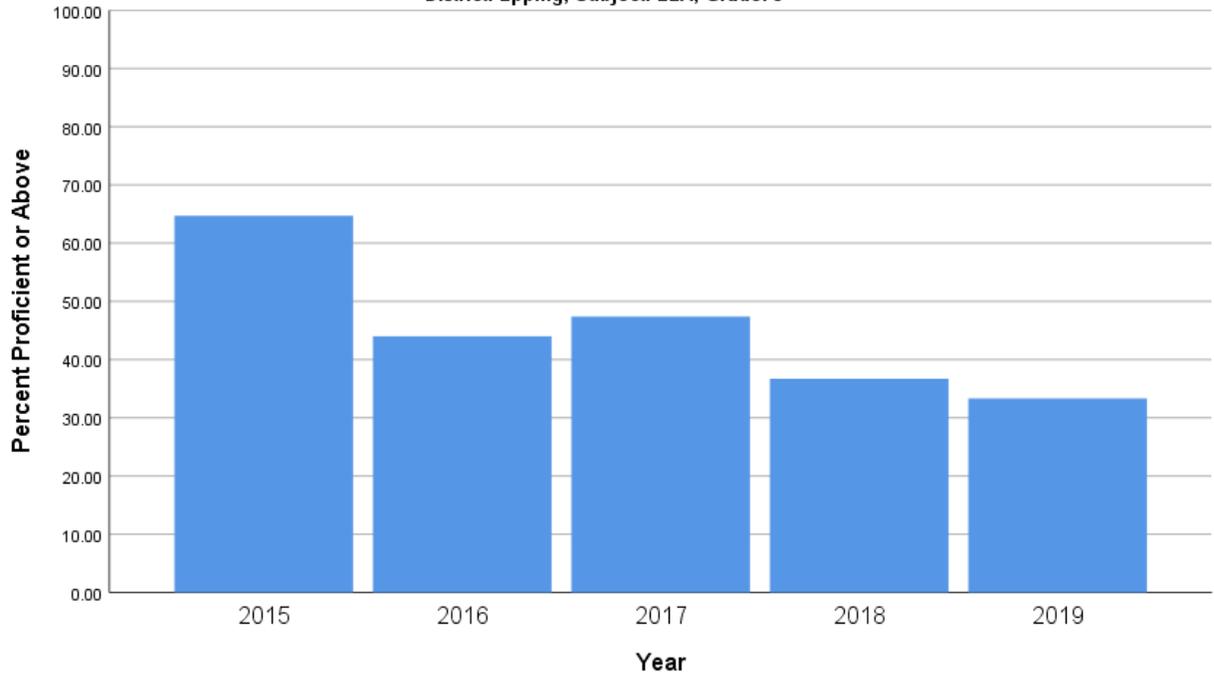
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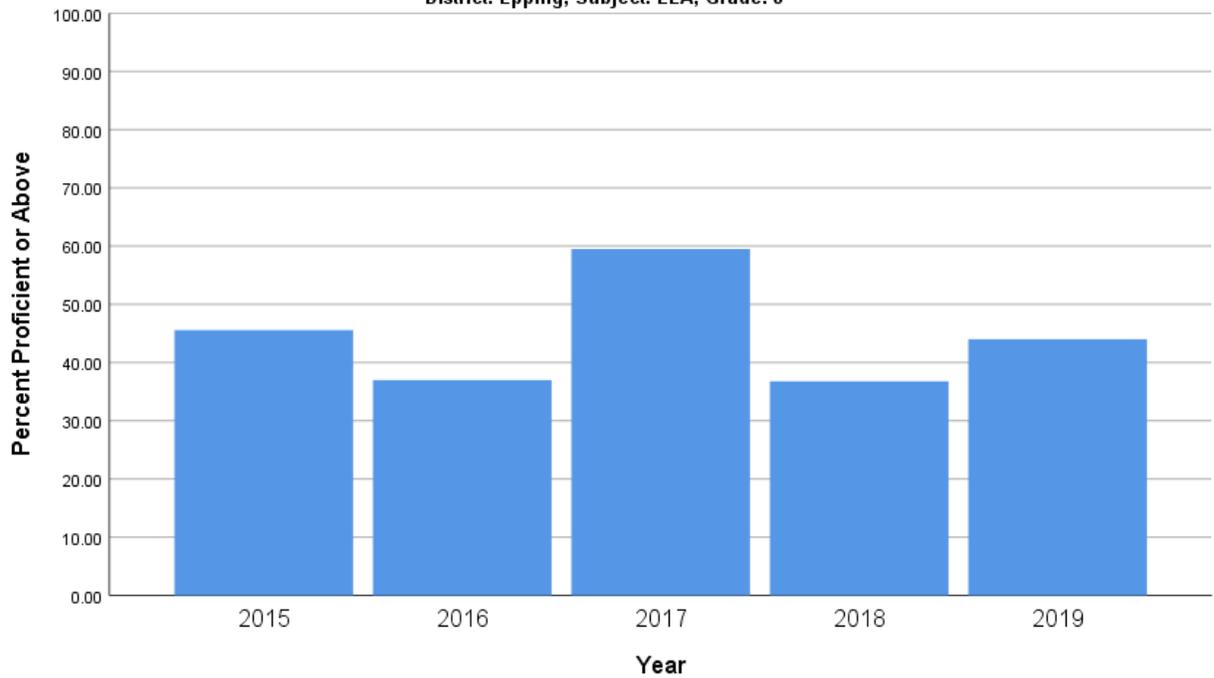
District: Epping, Subject: ELA, Grade: 4



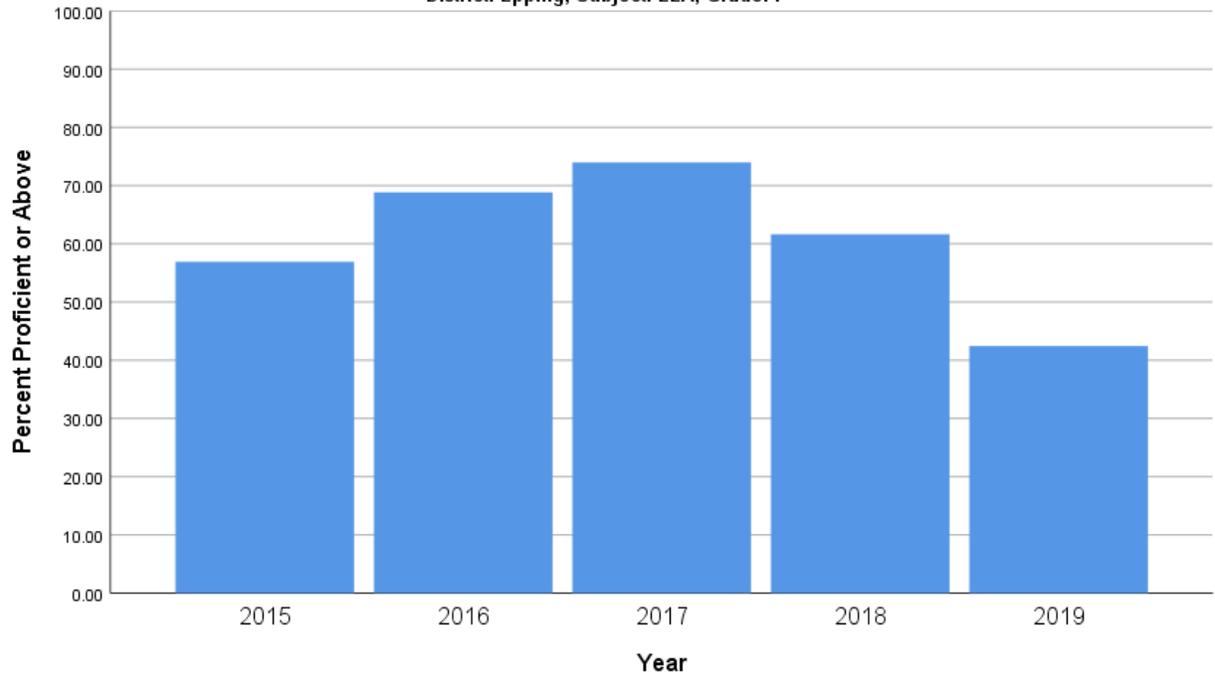
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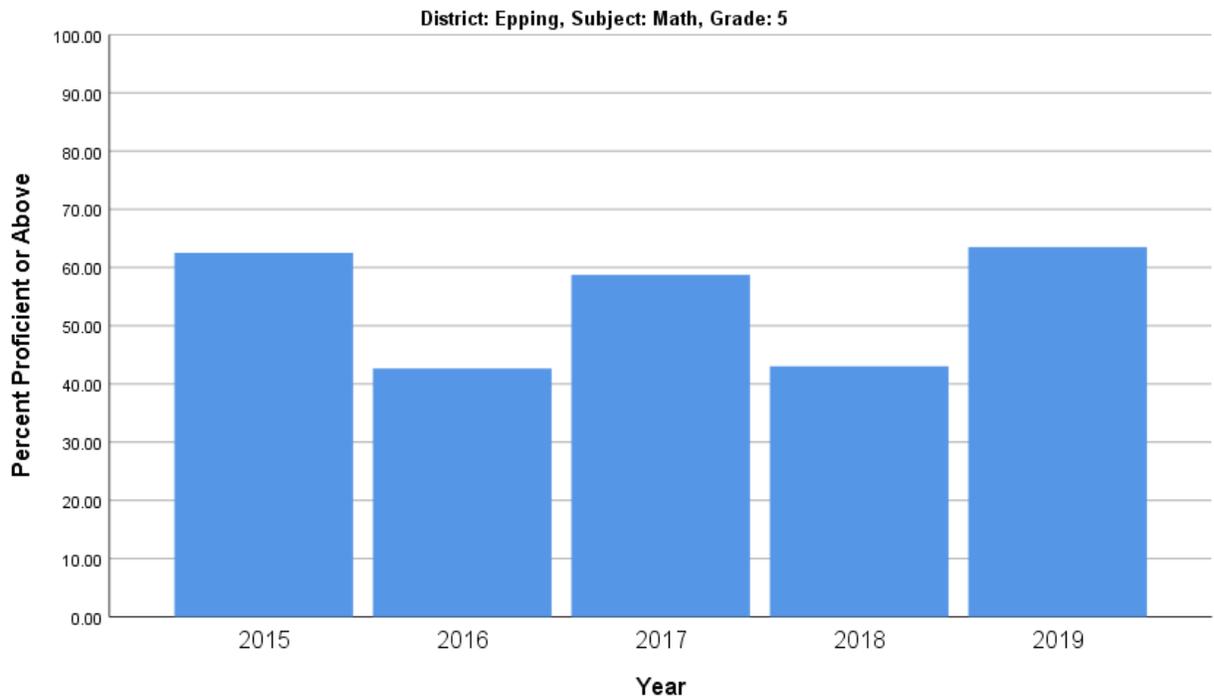
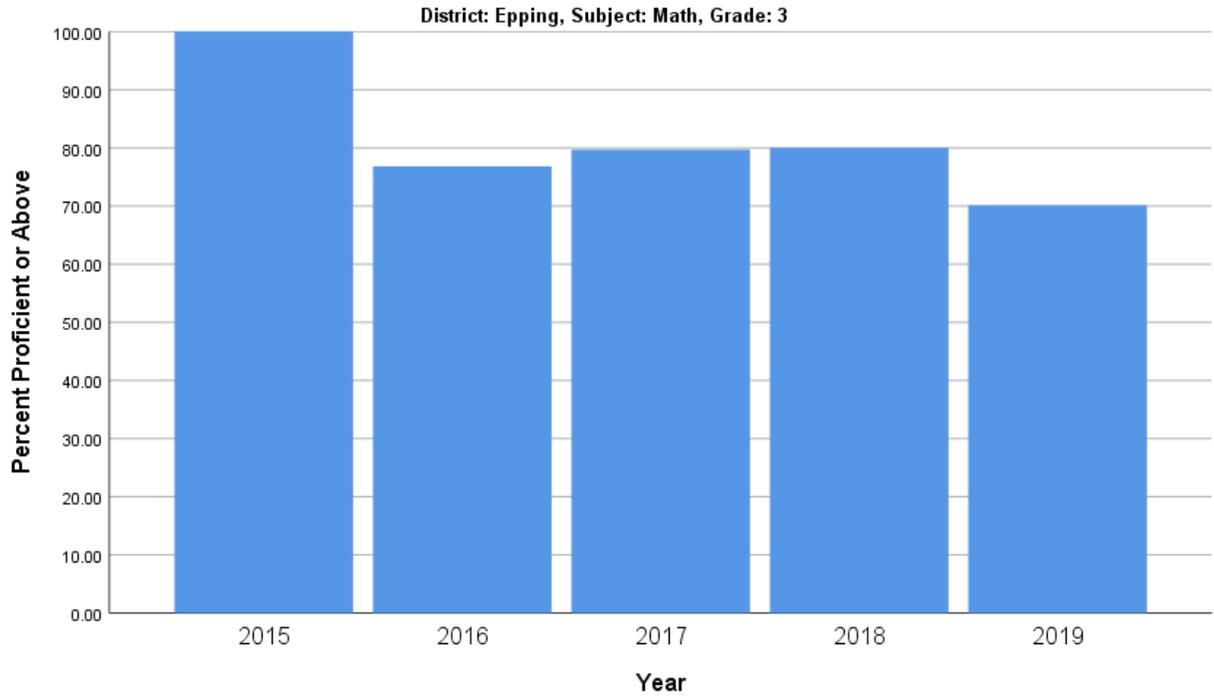


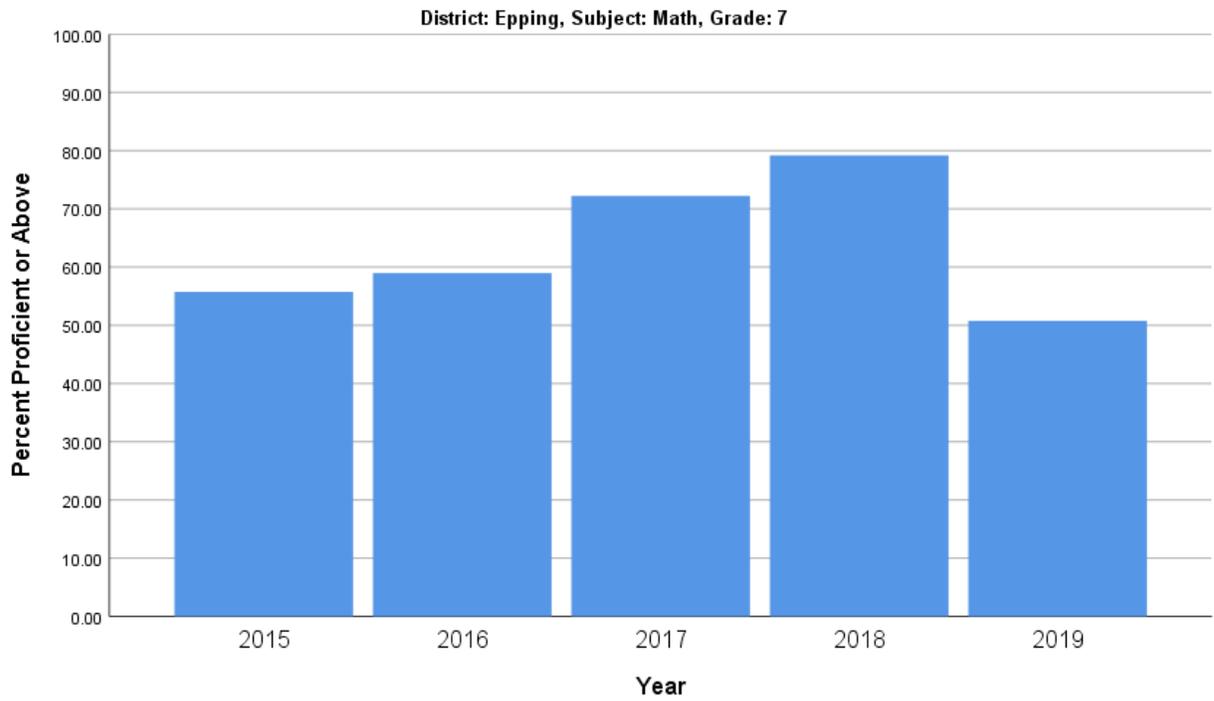
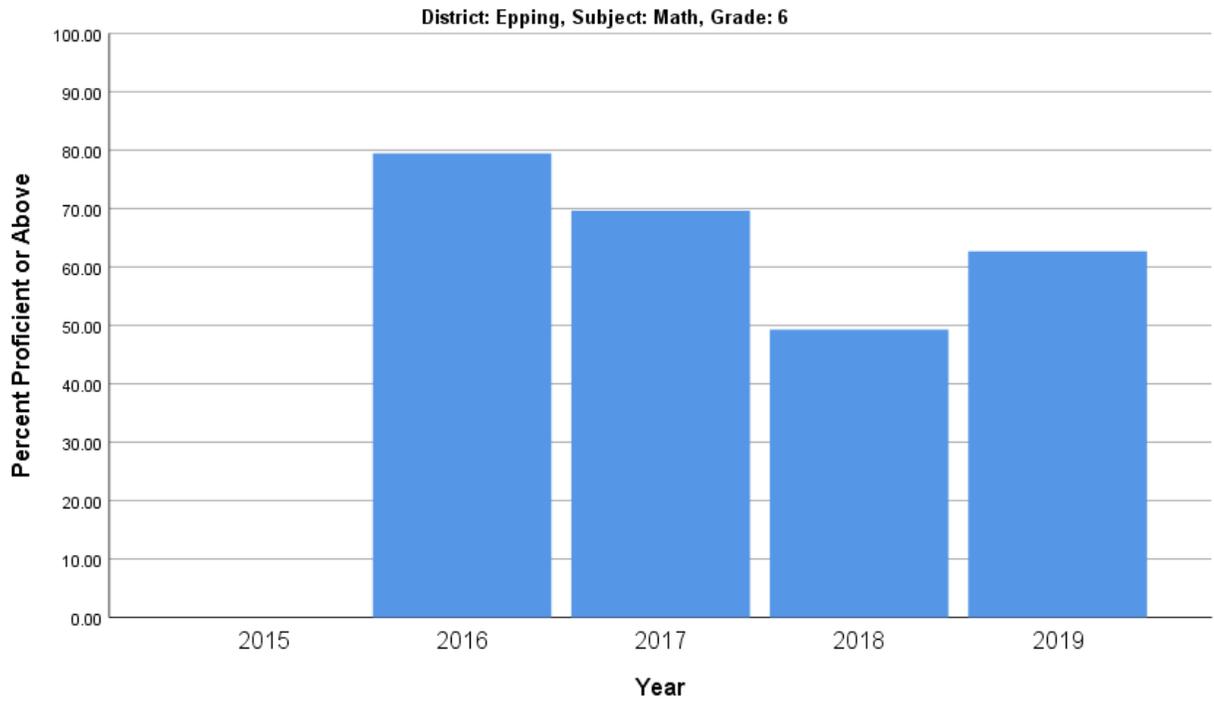
District: Epping, Subject: ELA, Grade: 6



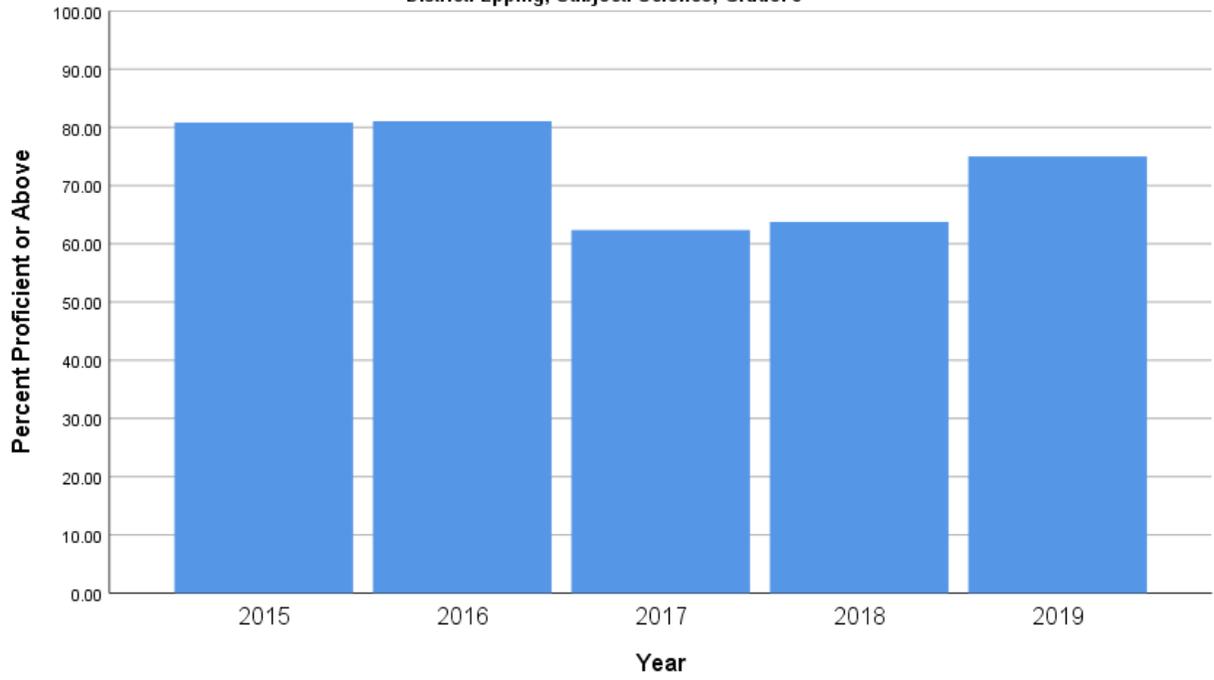
District: Epping, Subject: ELA, Grade: 7



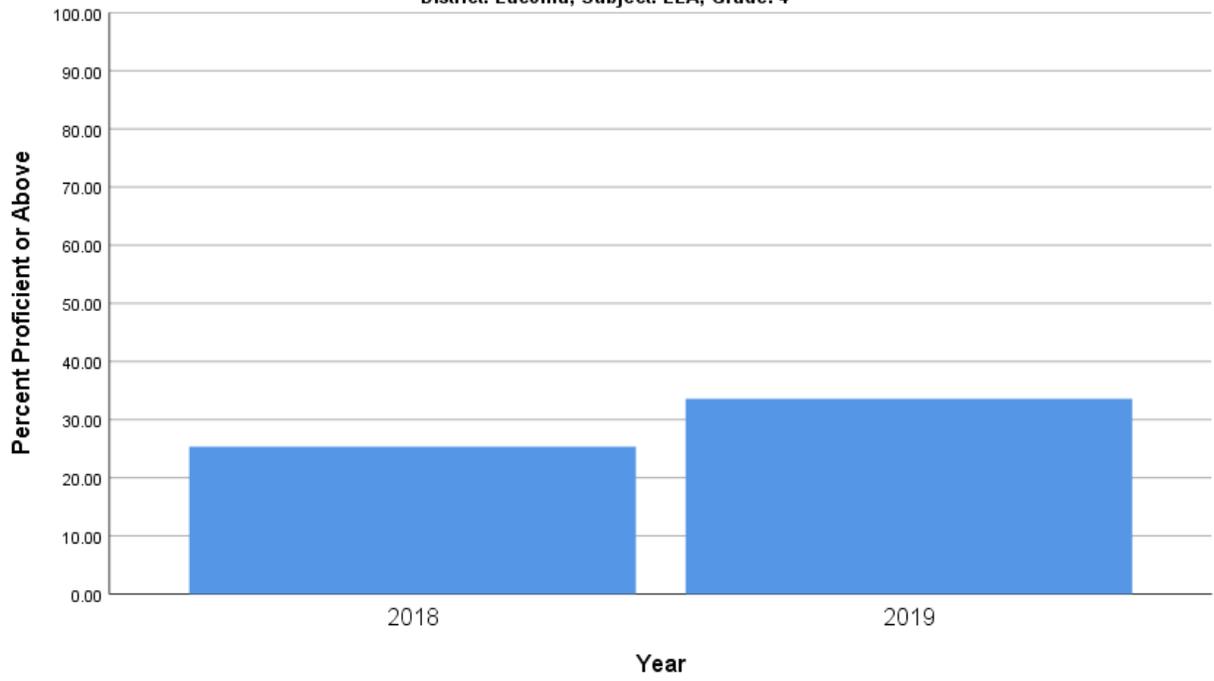




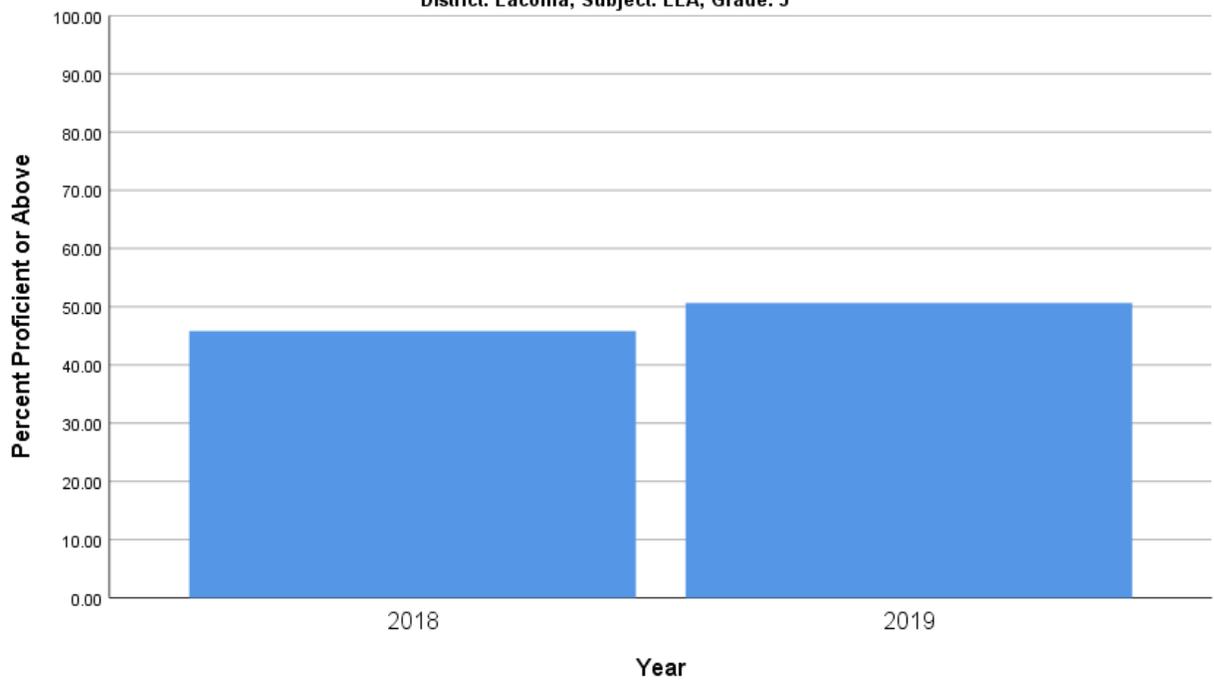
District: Epping, Subject: Science, Grade: 8

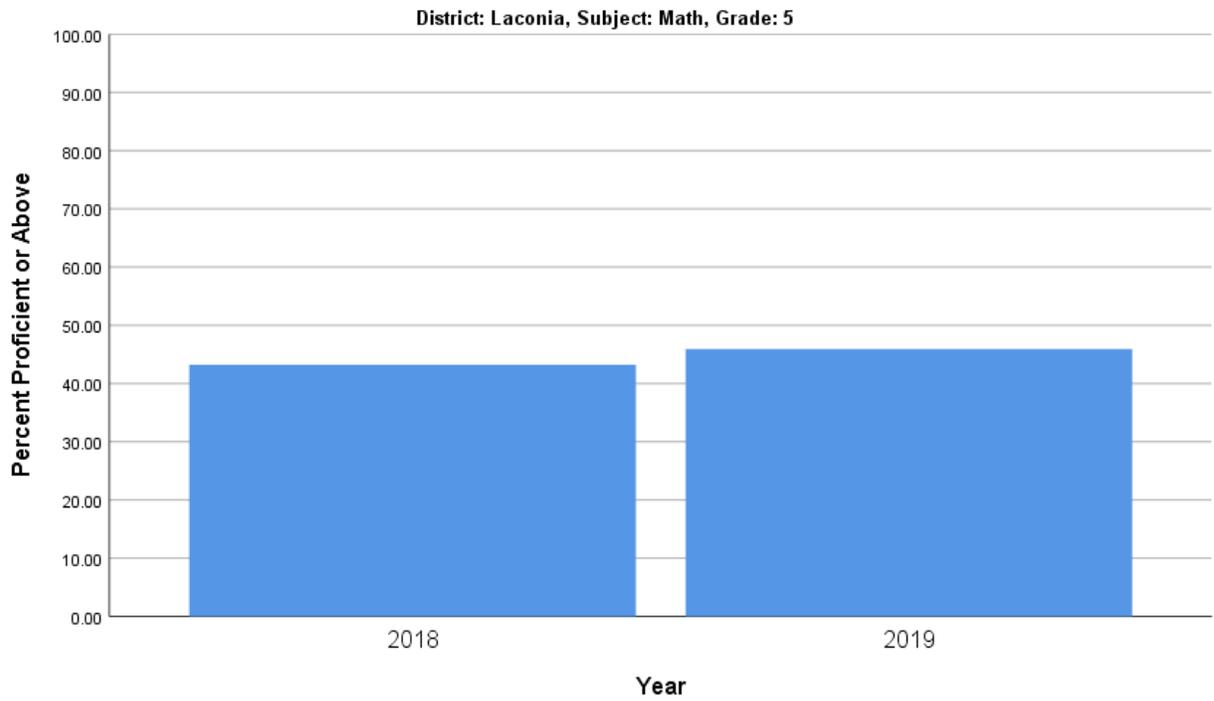
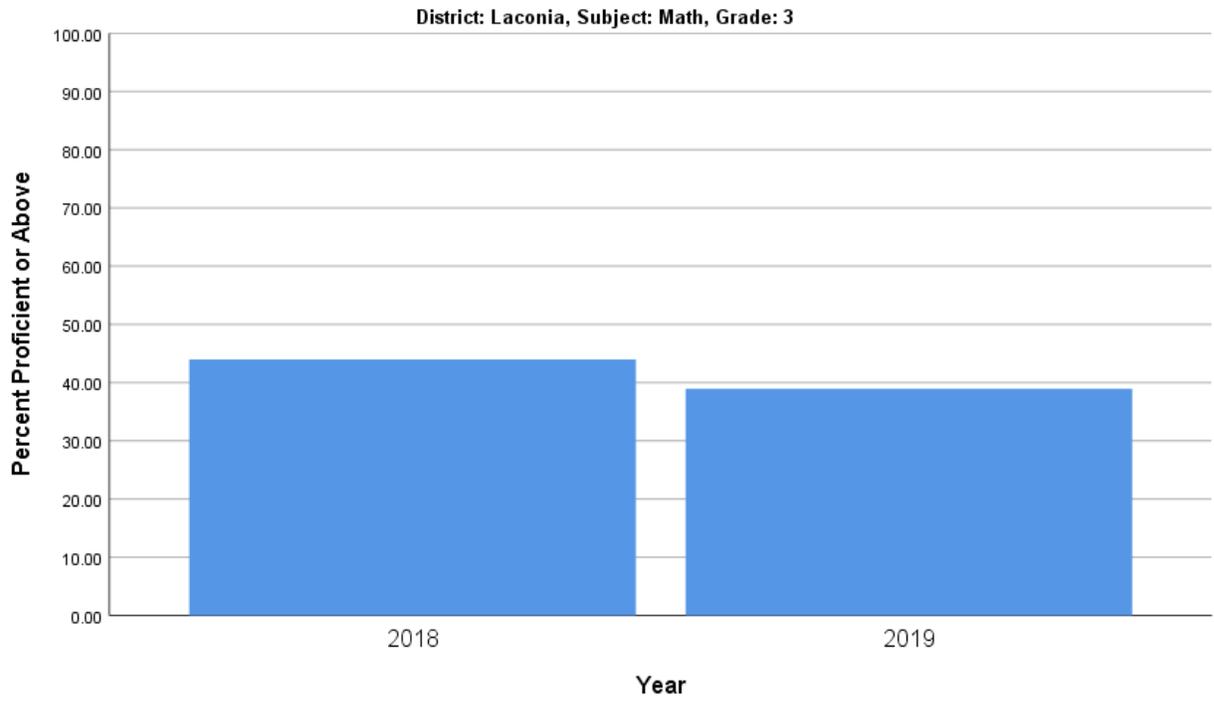


District: Laconia, Subject: ELA, Grade: 4

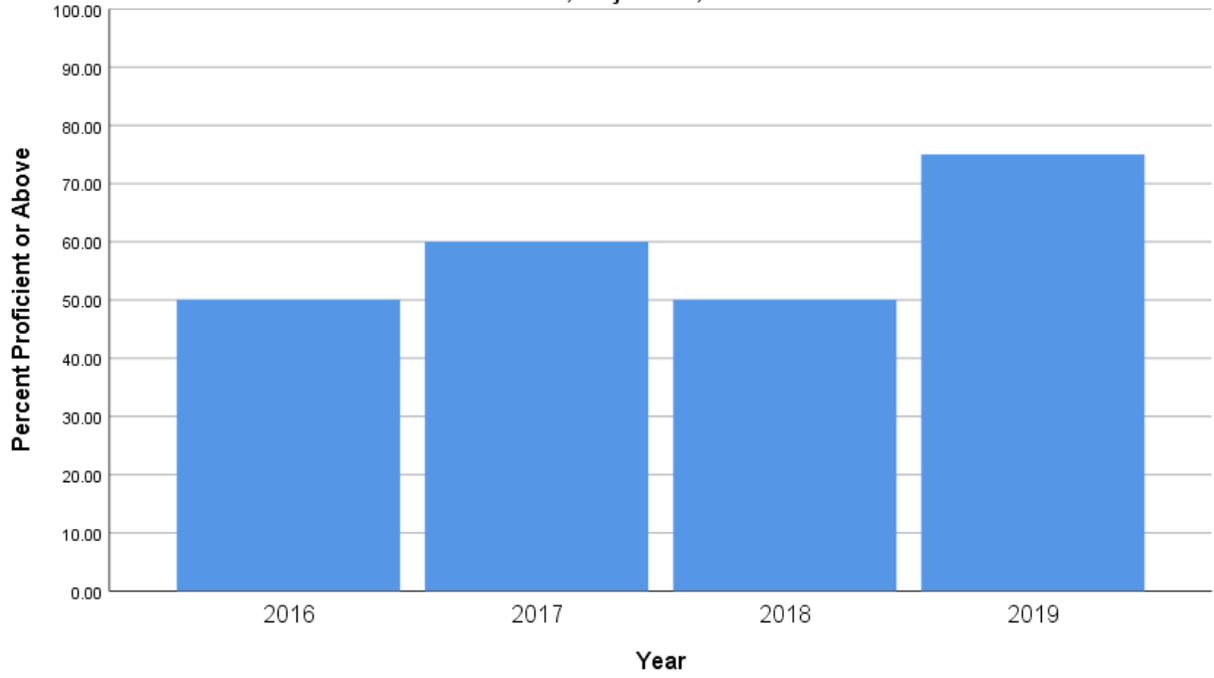


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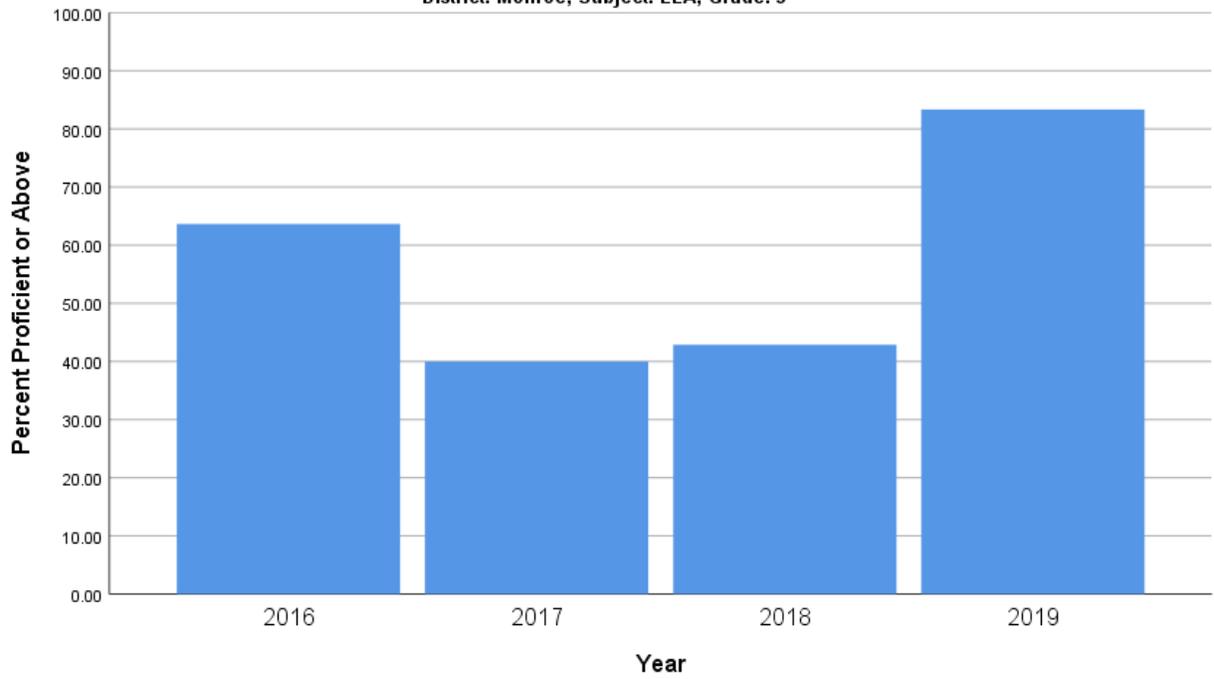




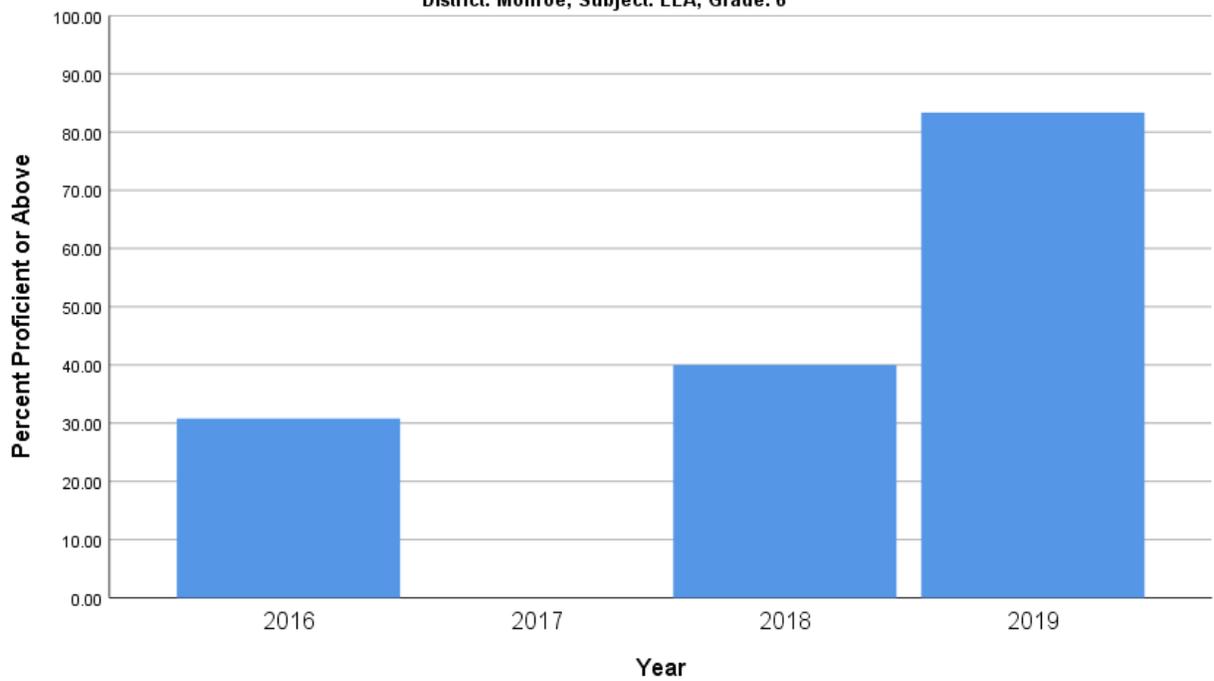
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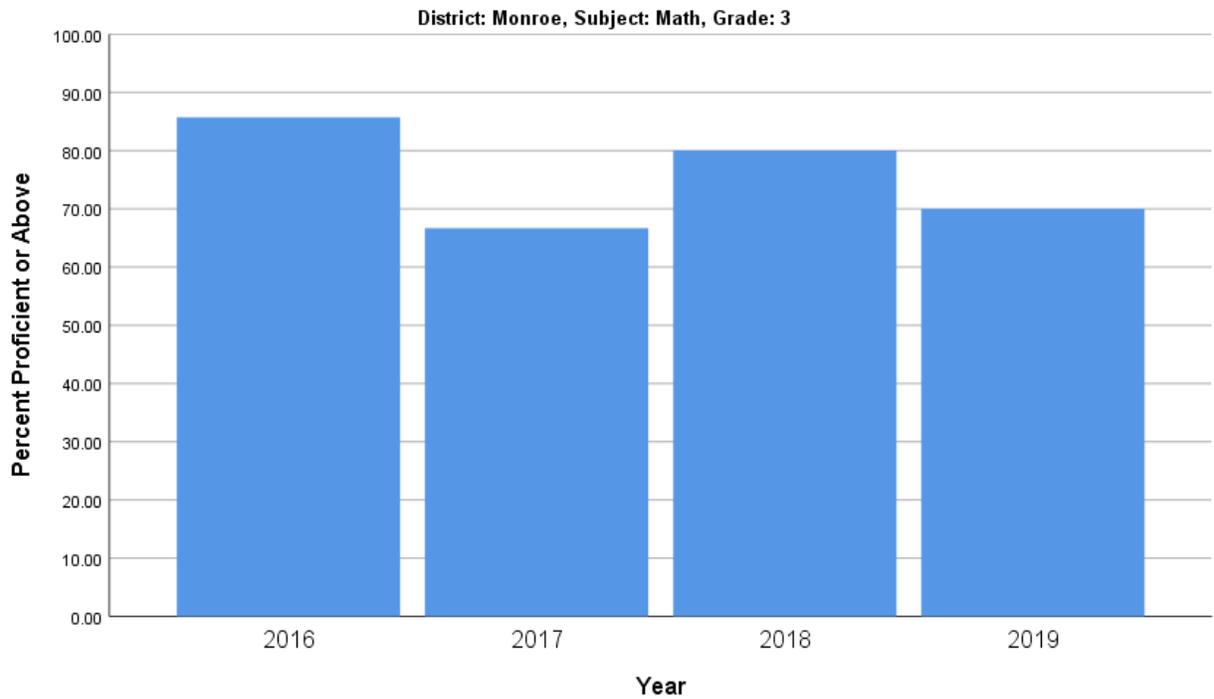
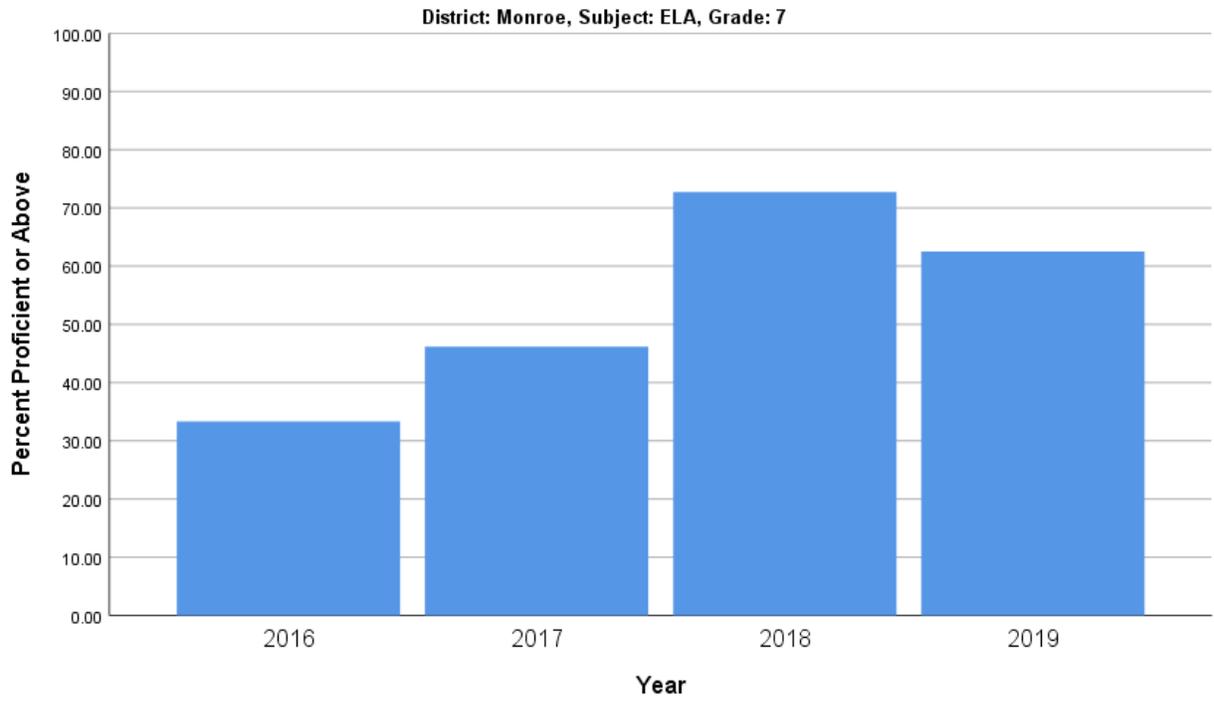


District: Monroe, Subject: ELA, Grade: 5

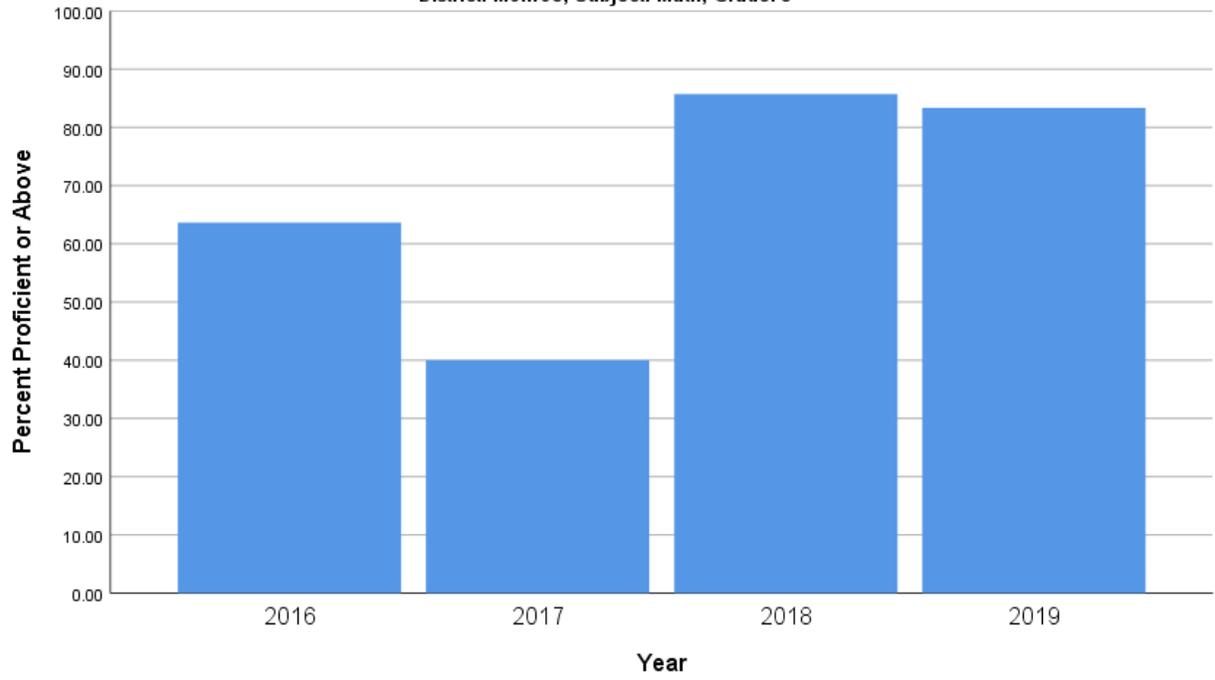


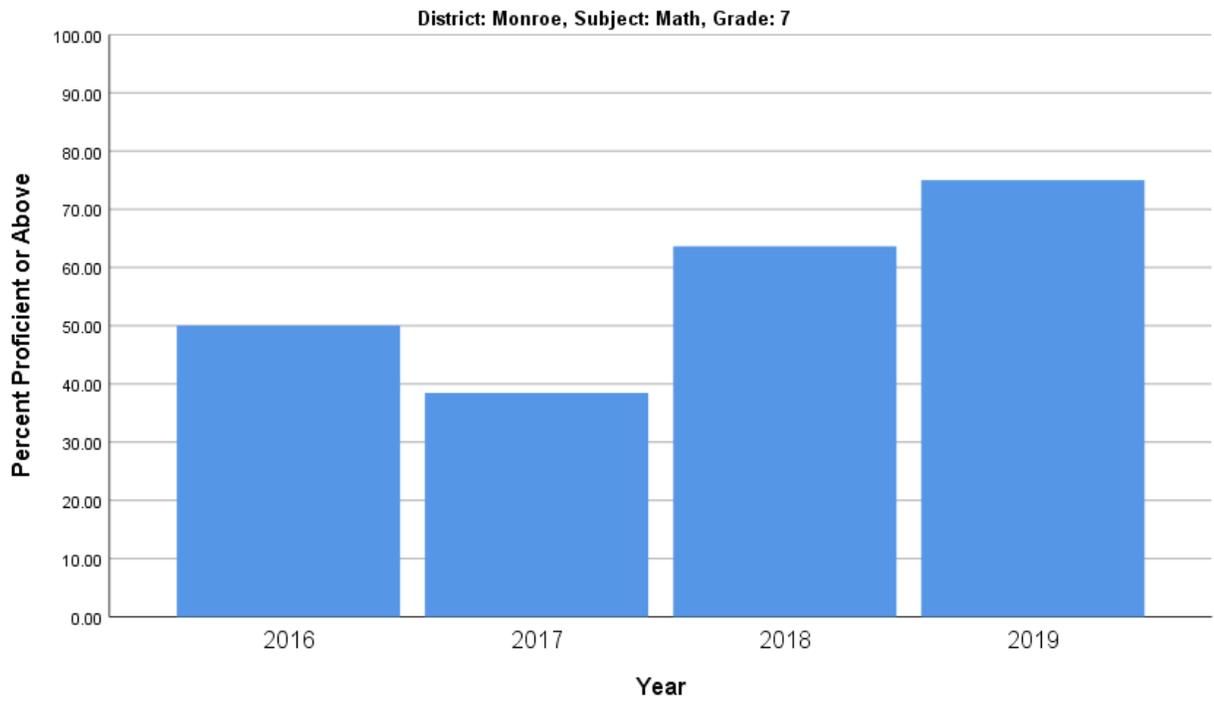
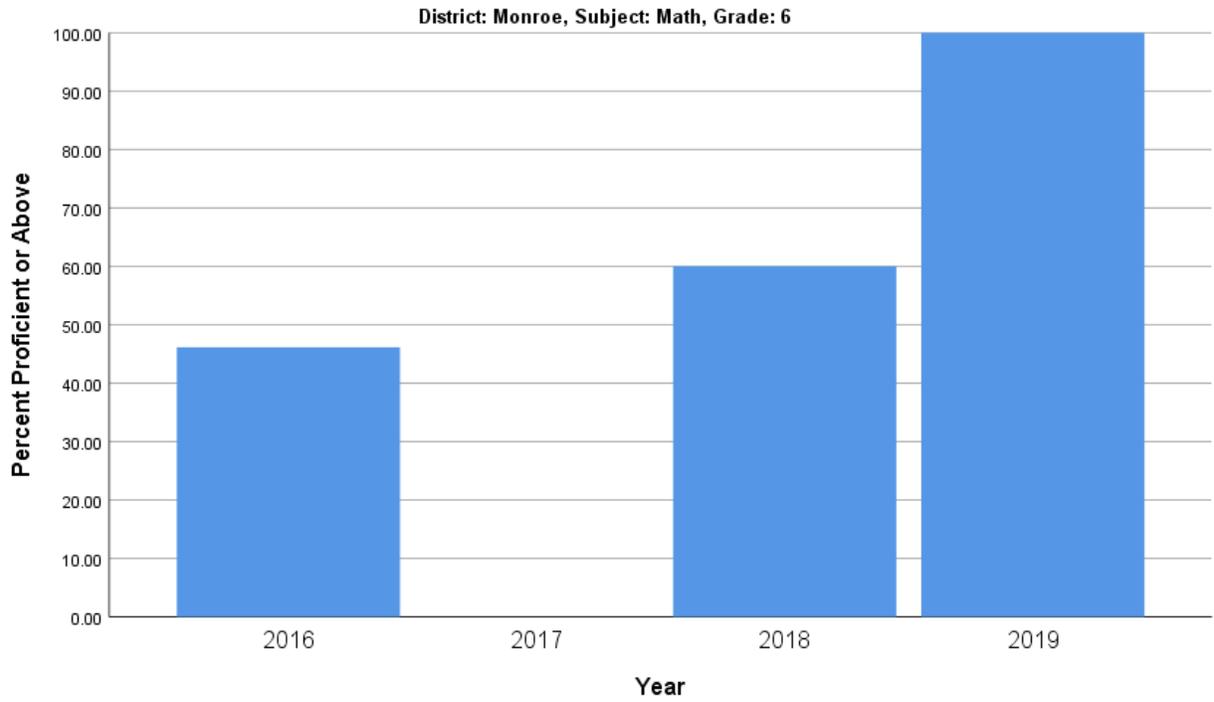
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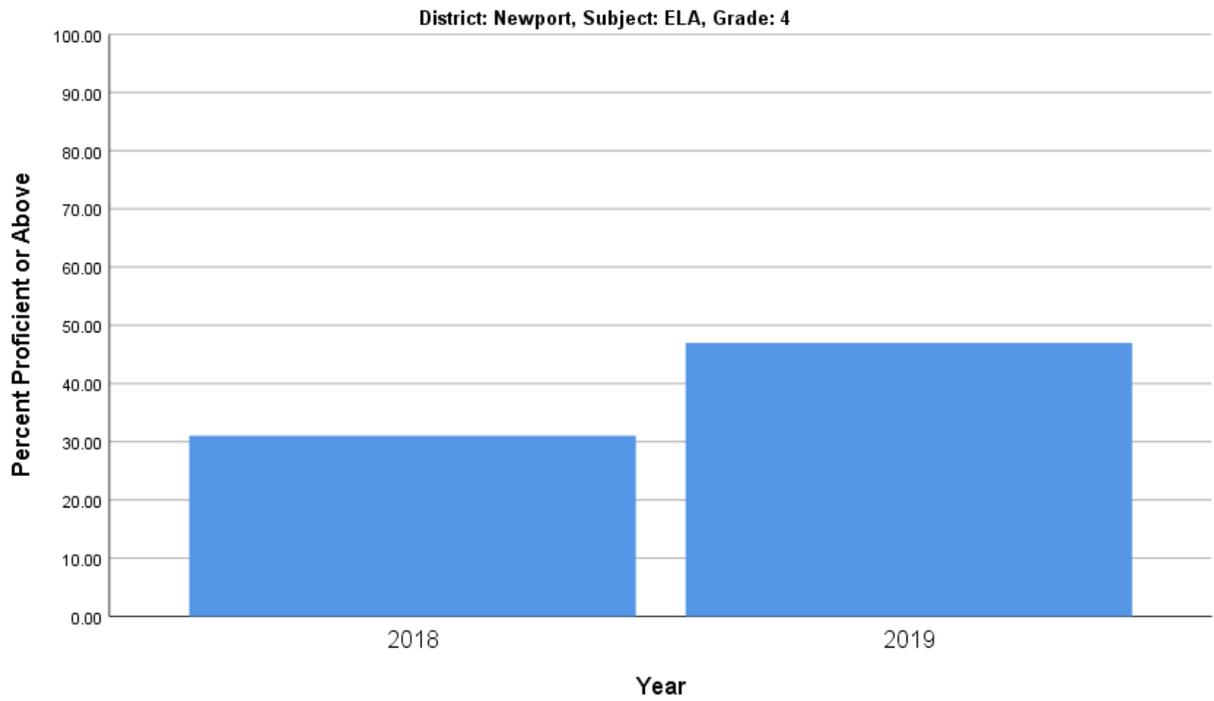
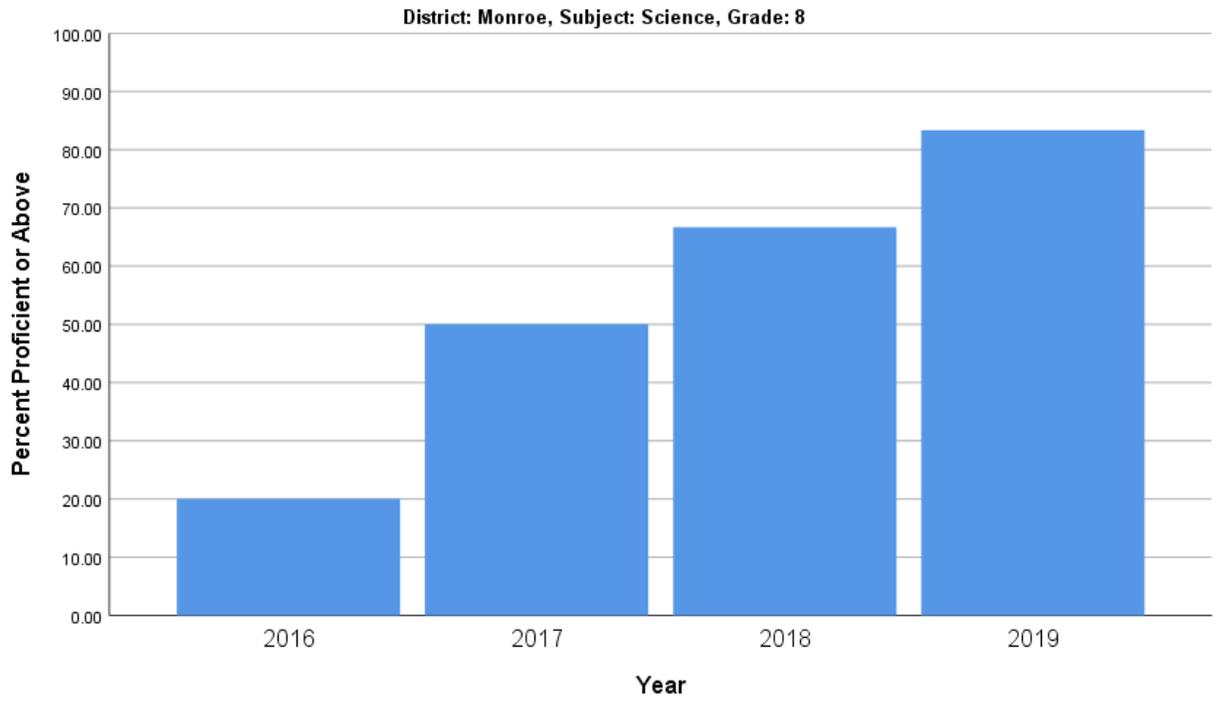




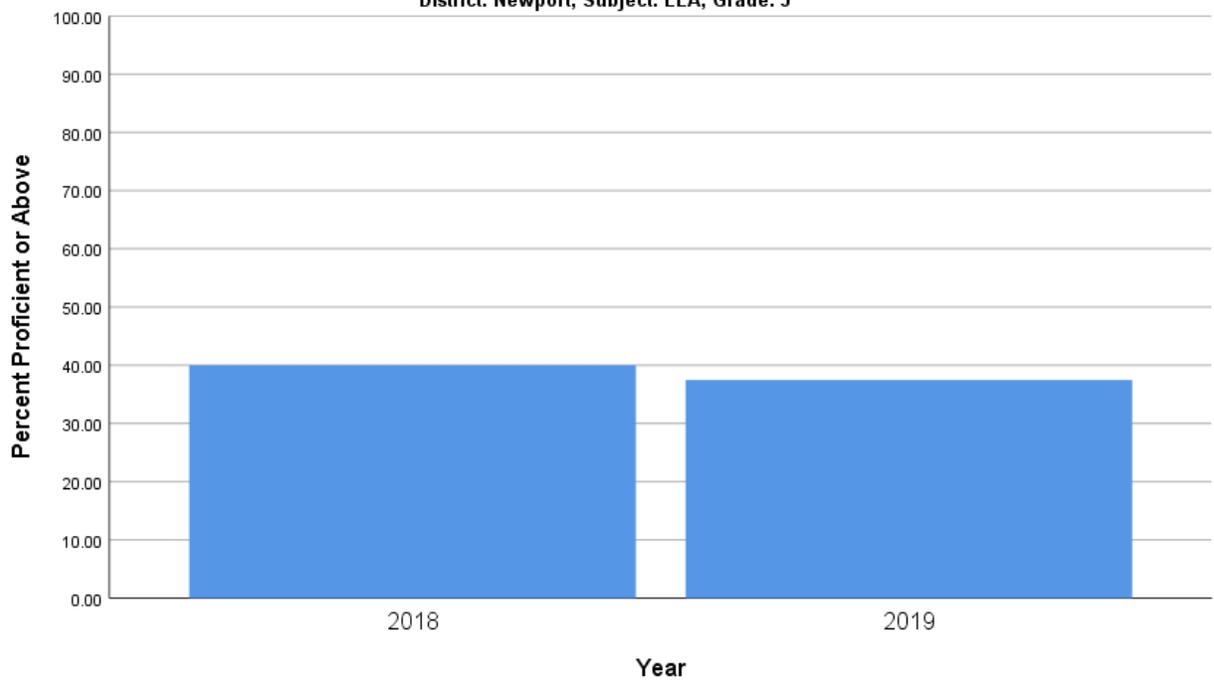
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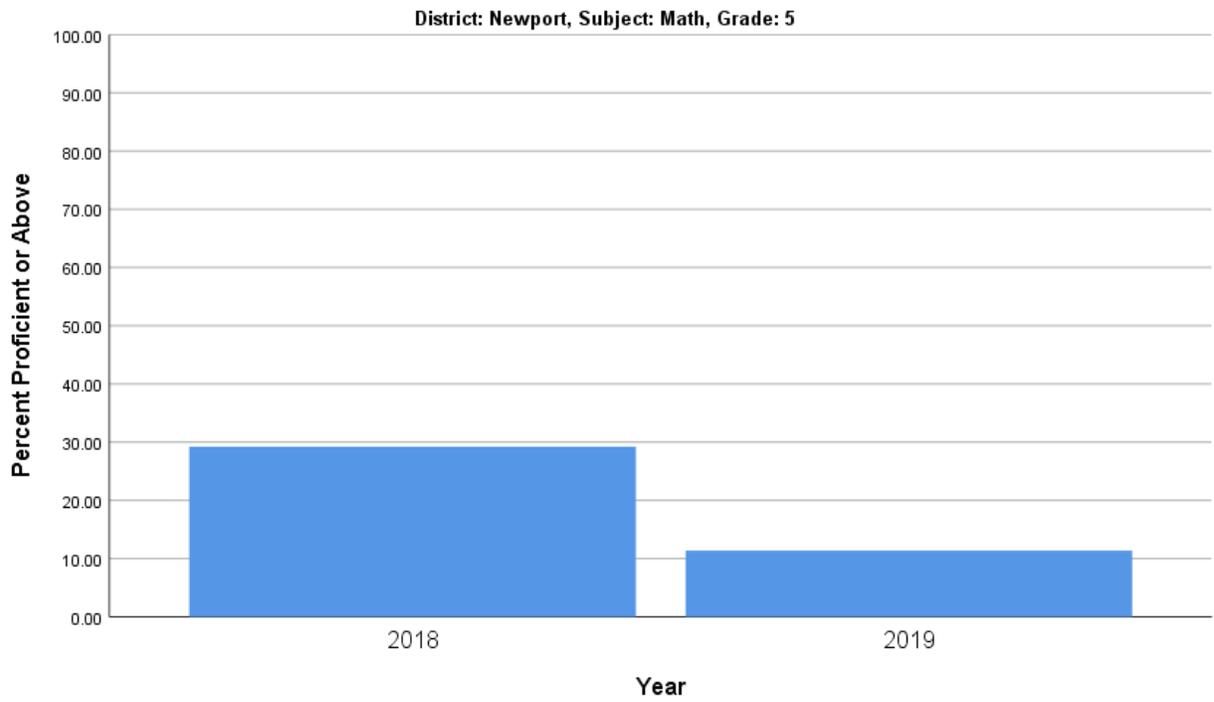
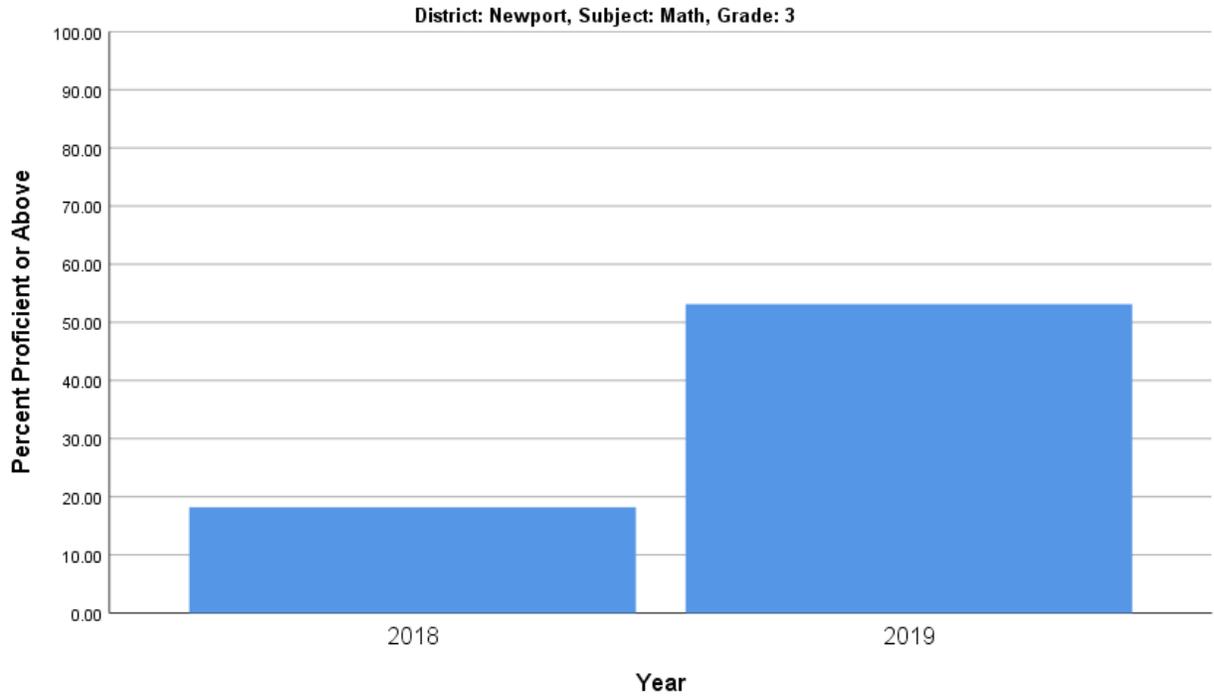


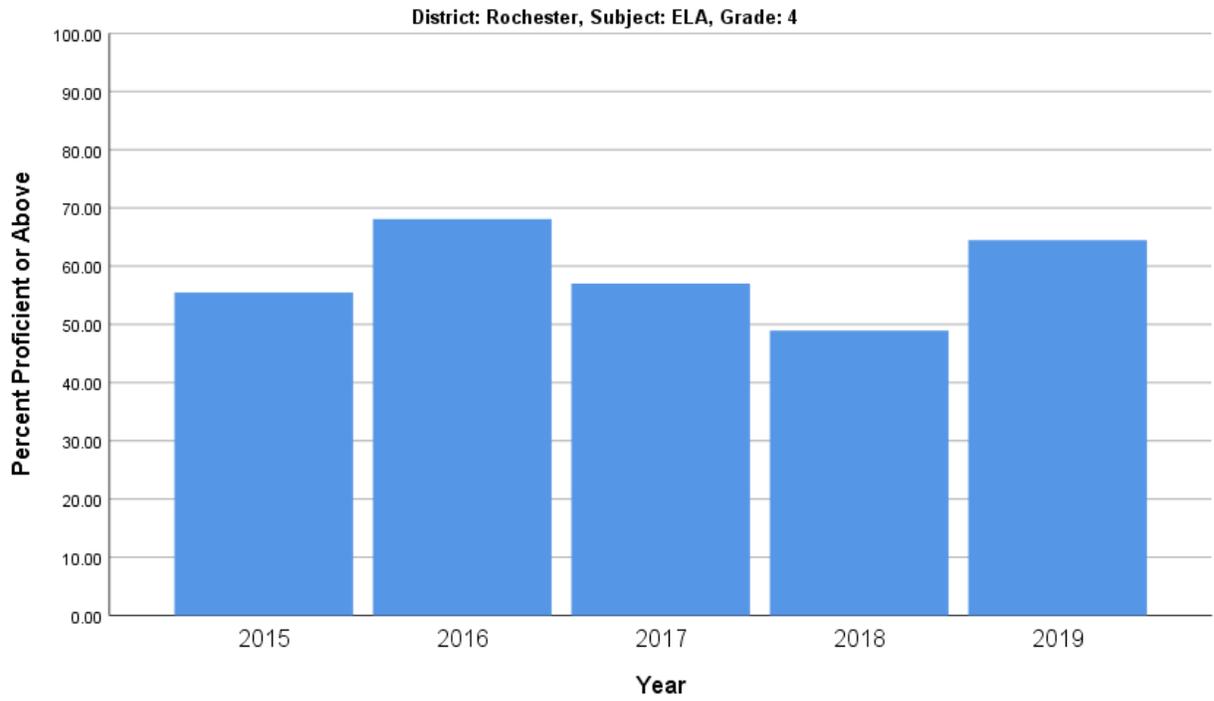


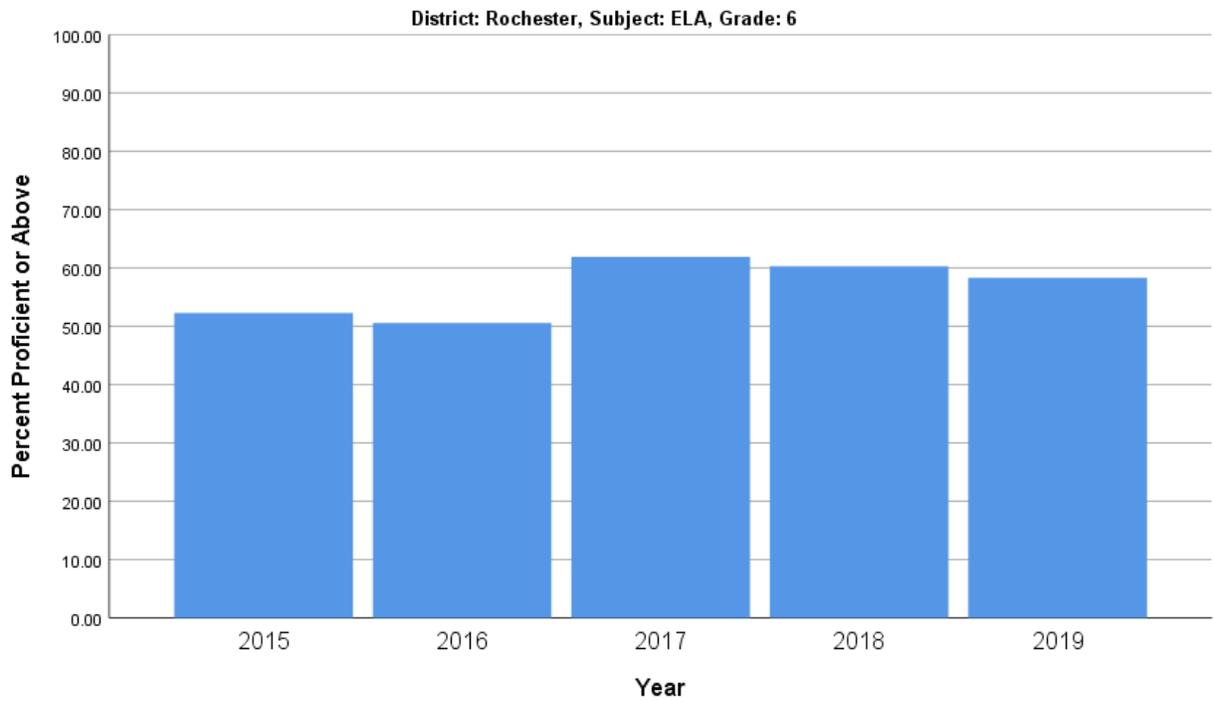
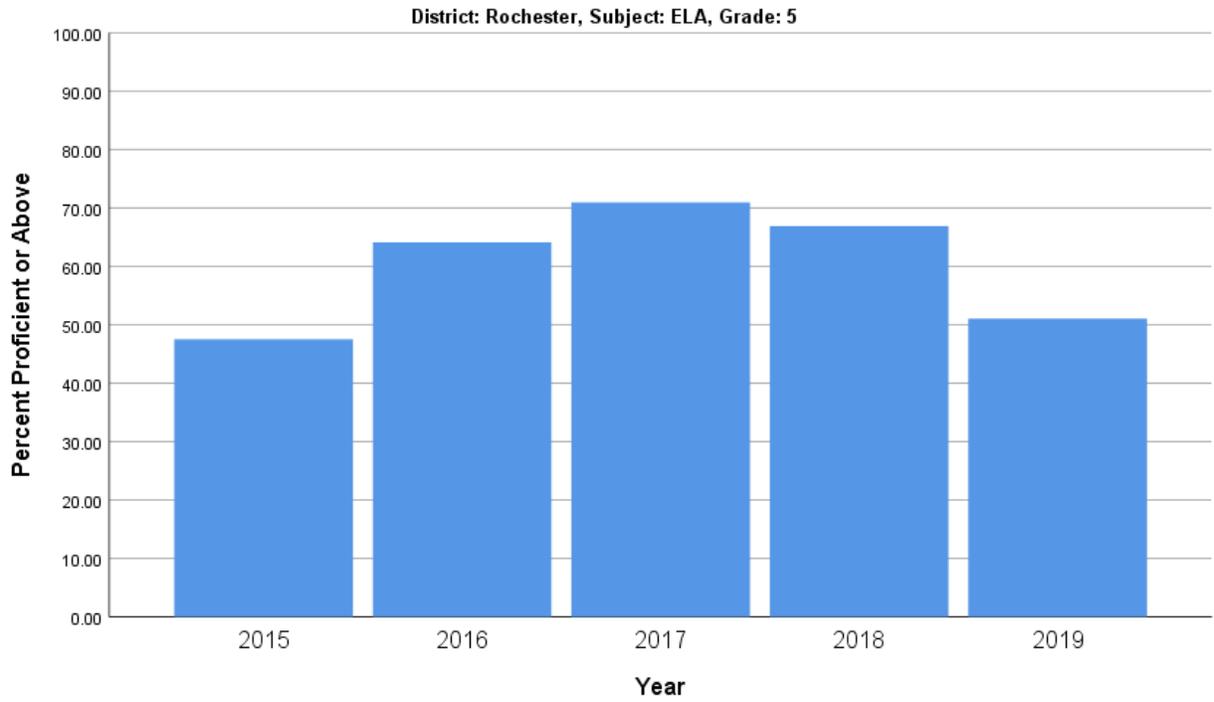


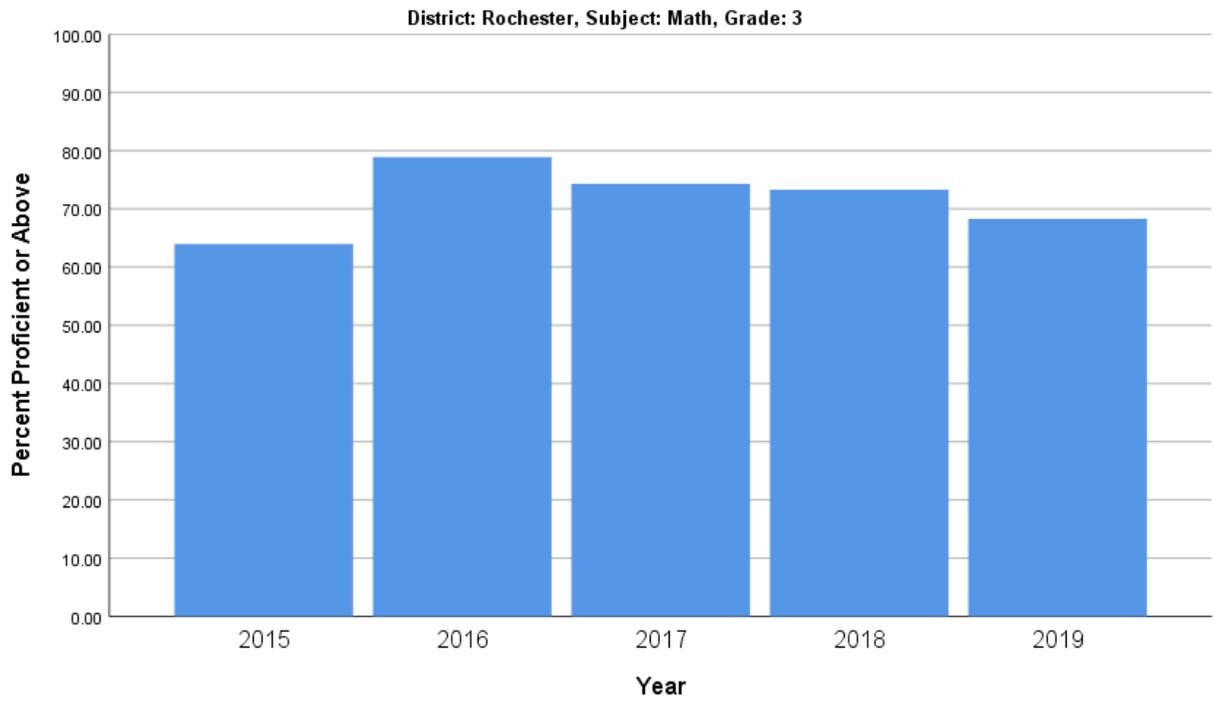
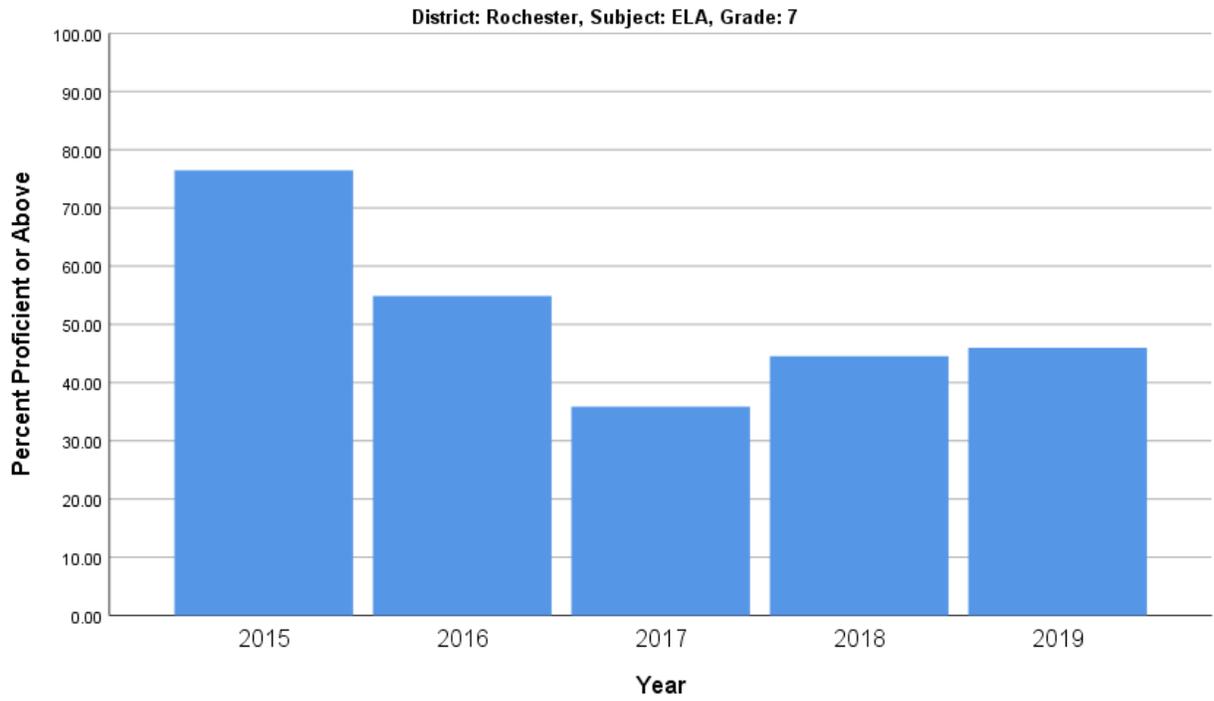
District: Newport, Subject: ELA, Grade: 5



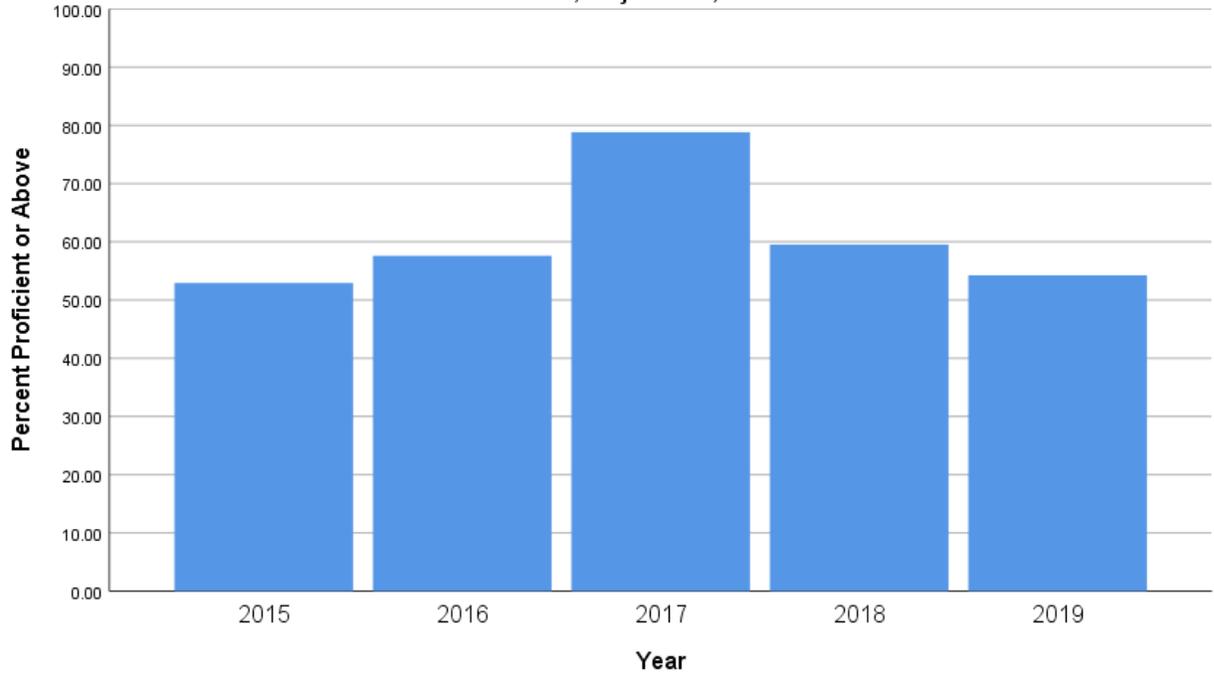


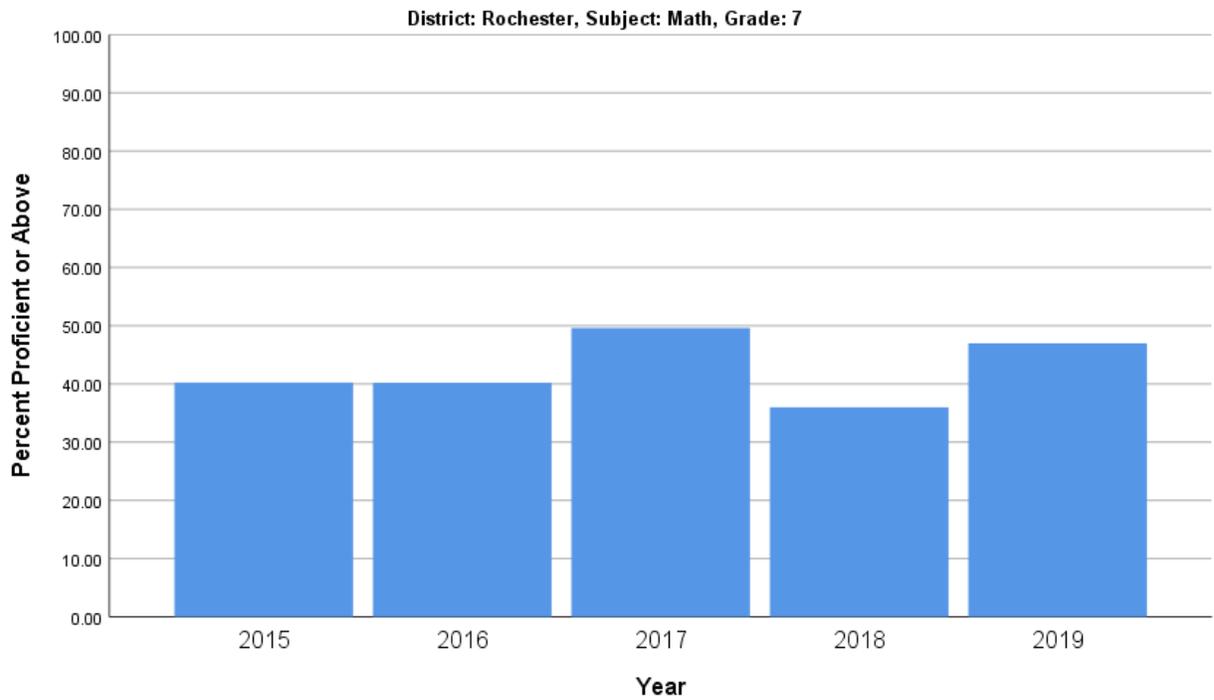
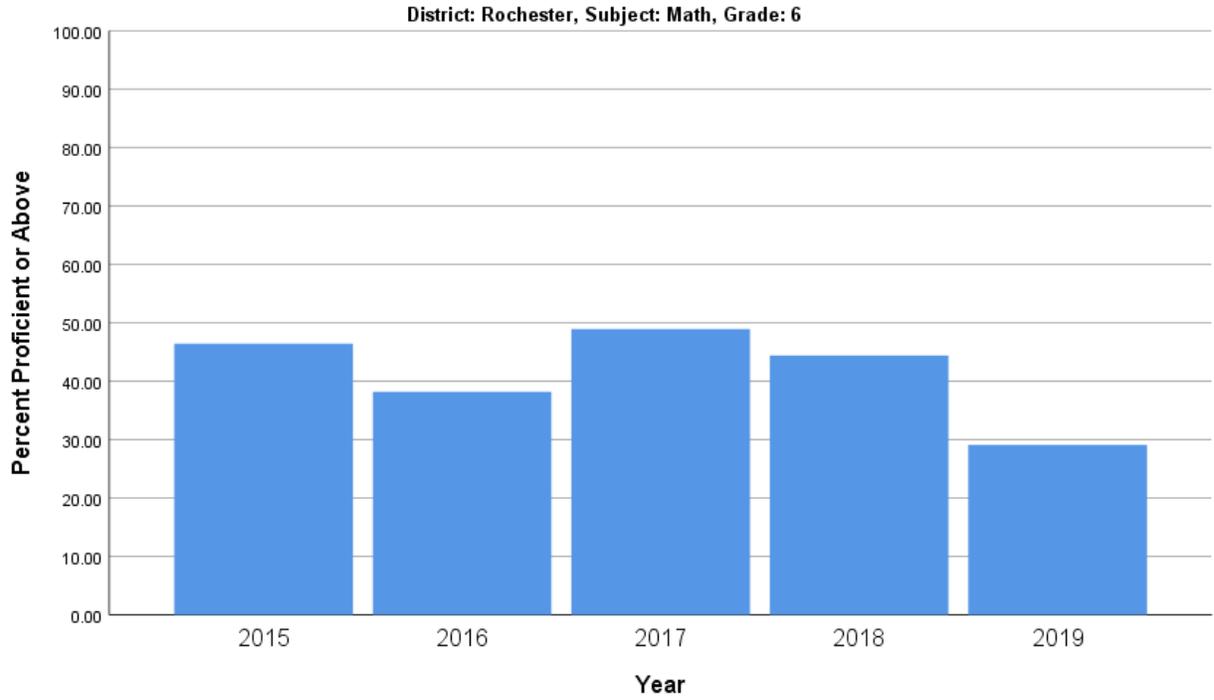


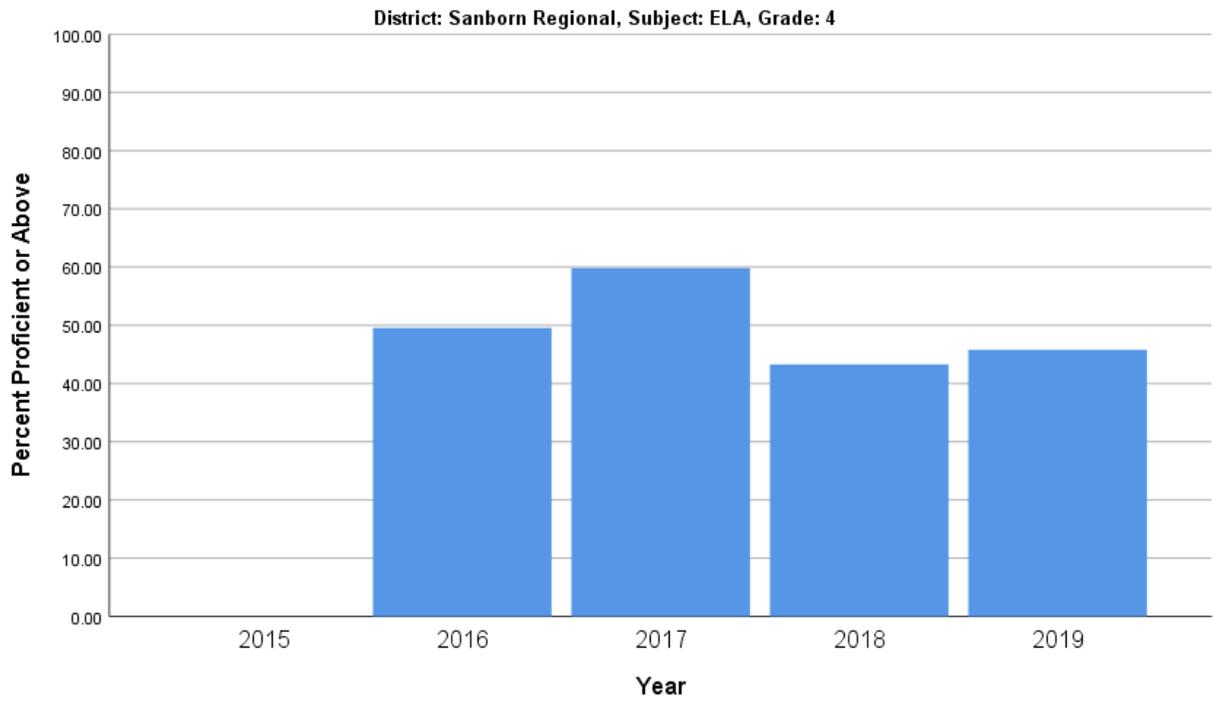
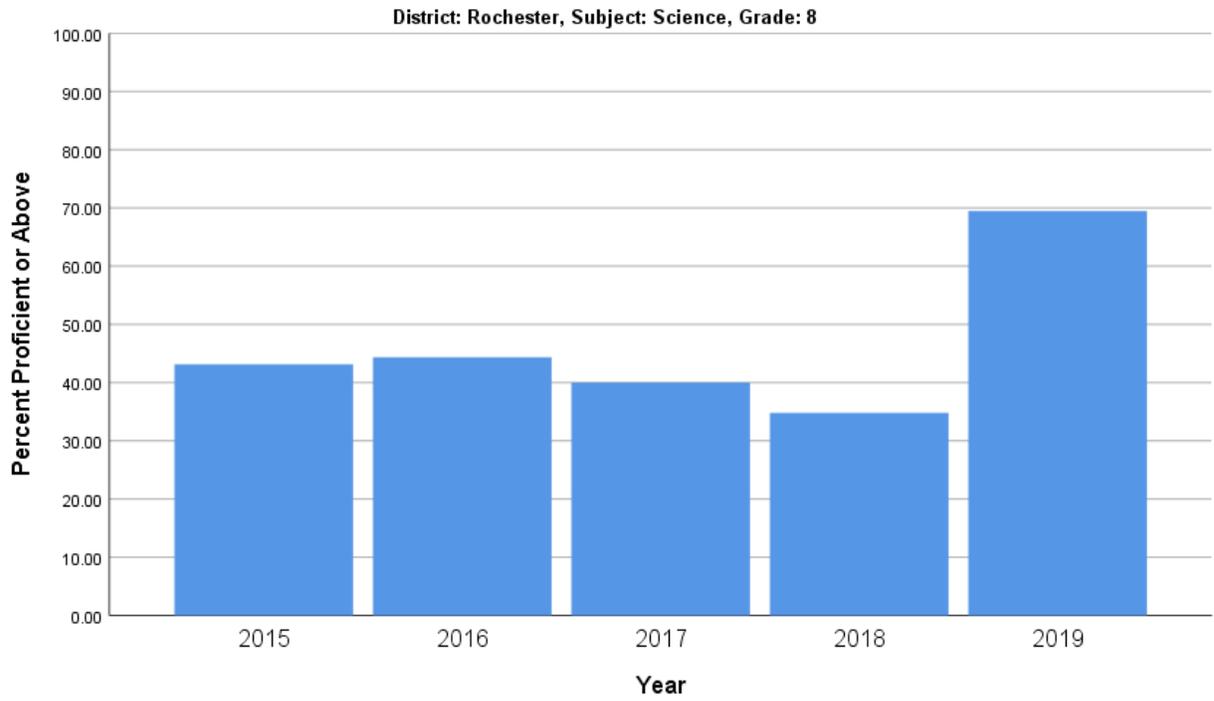




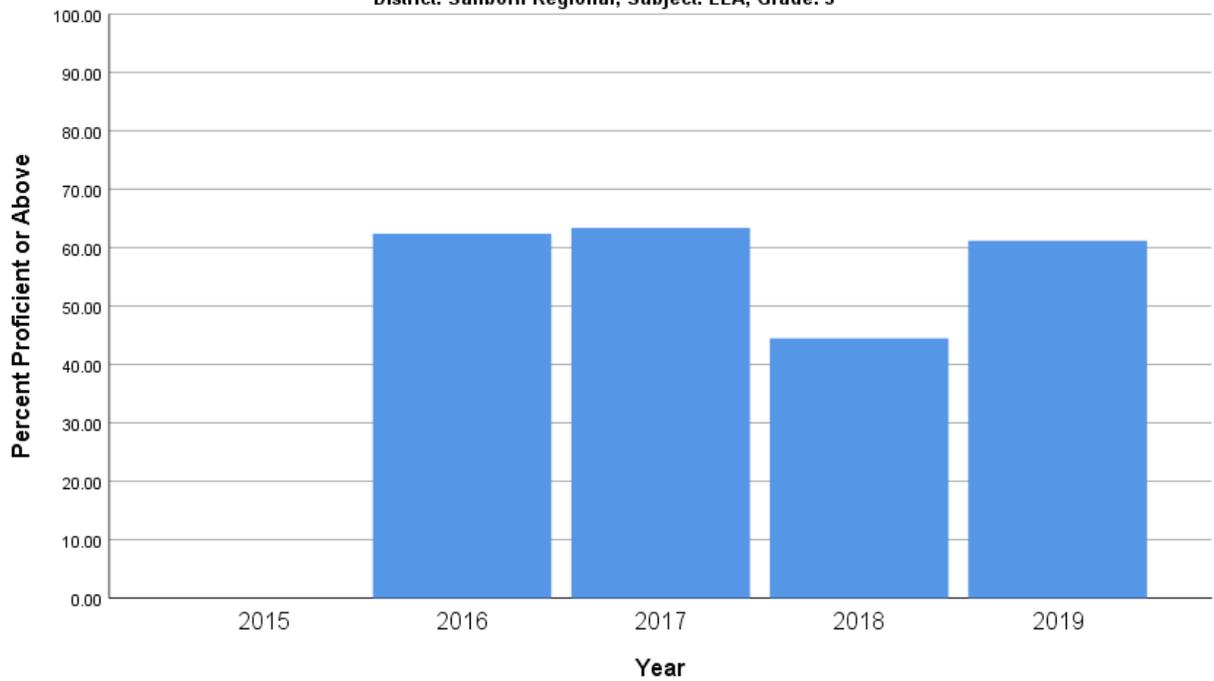
District: Rochester, Subject: Math, Grade: 5

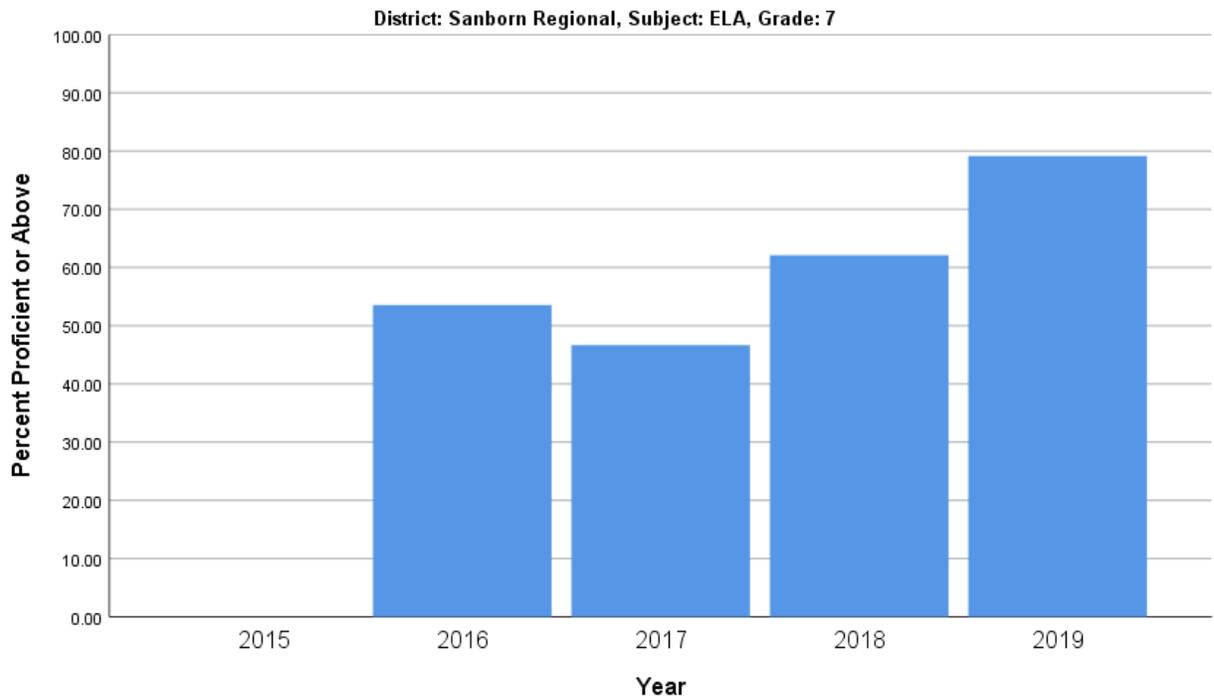
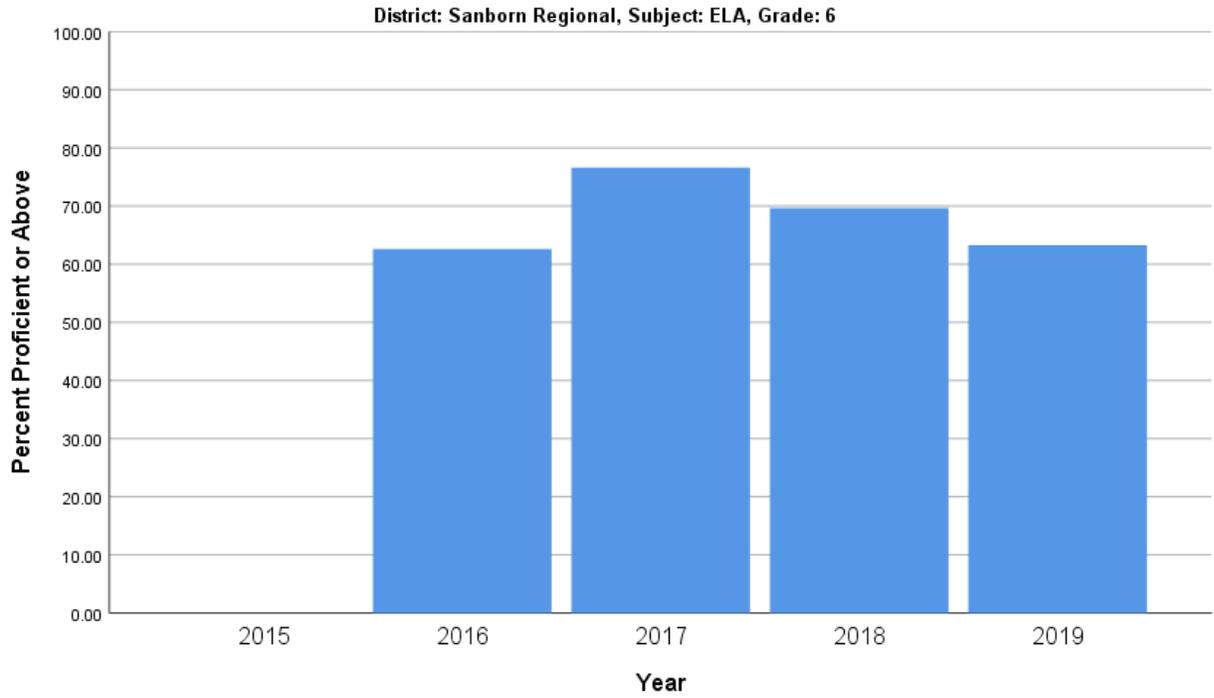




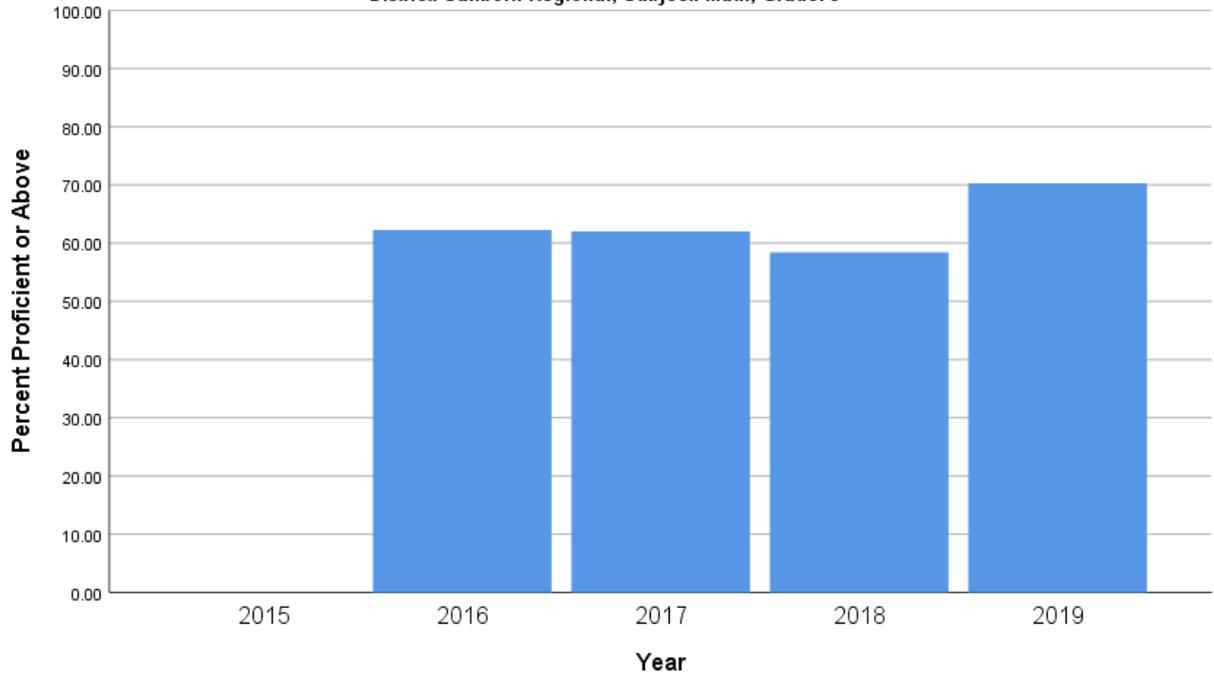


District: Sanborn Regional, Subject: ELA, Grade: 5

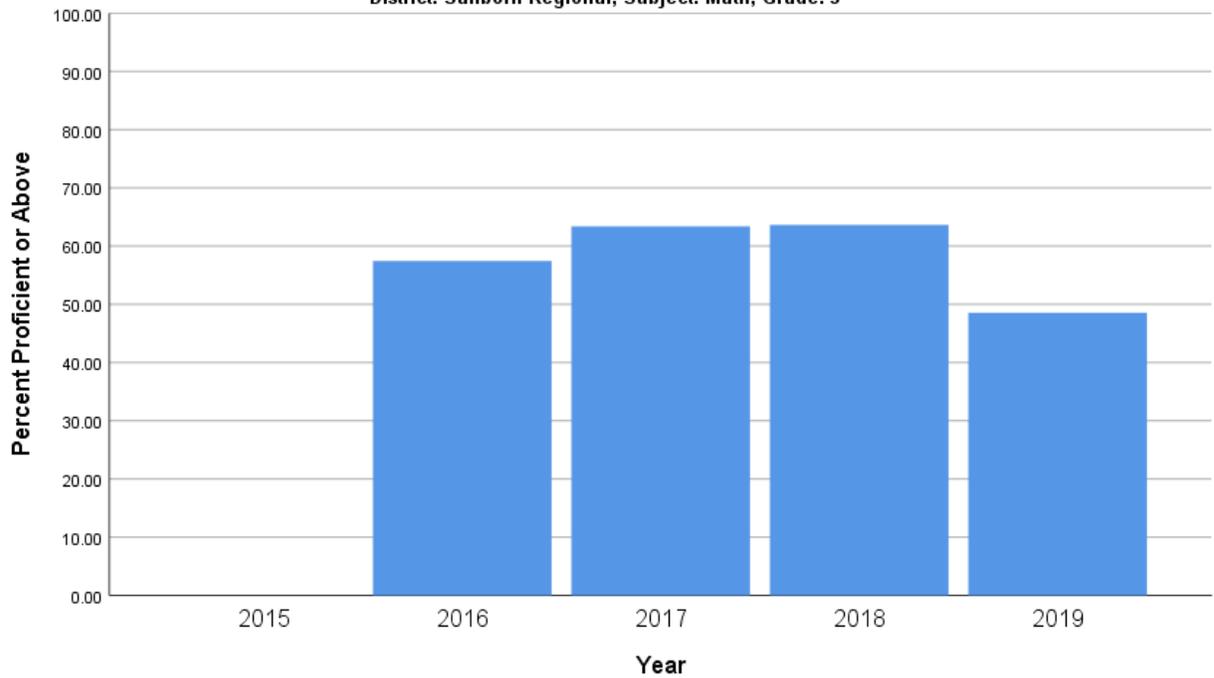




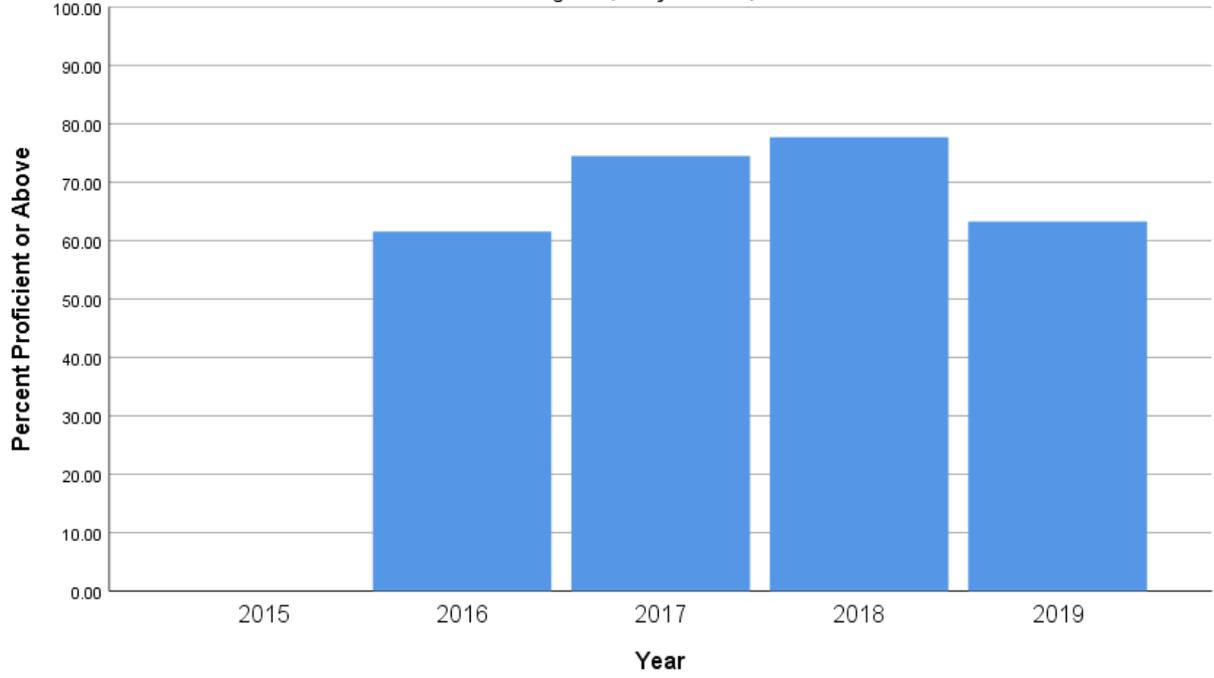
District: Sanborn Regional, Subject: Math, Grade: 3

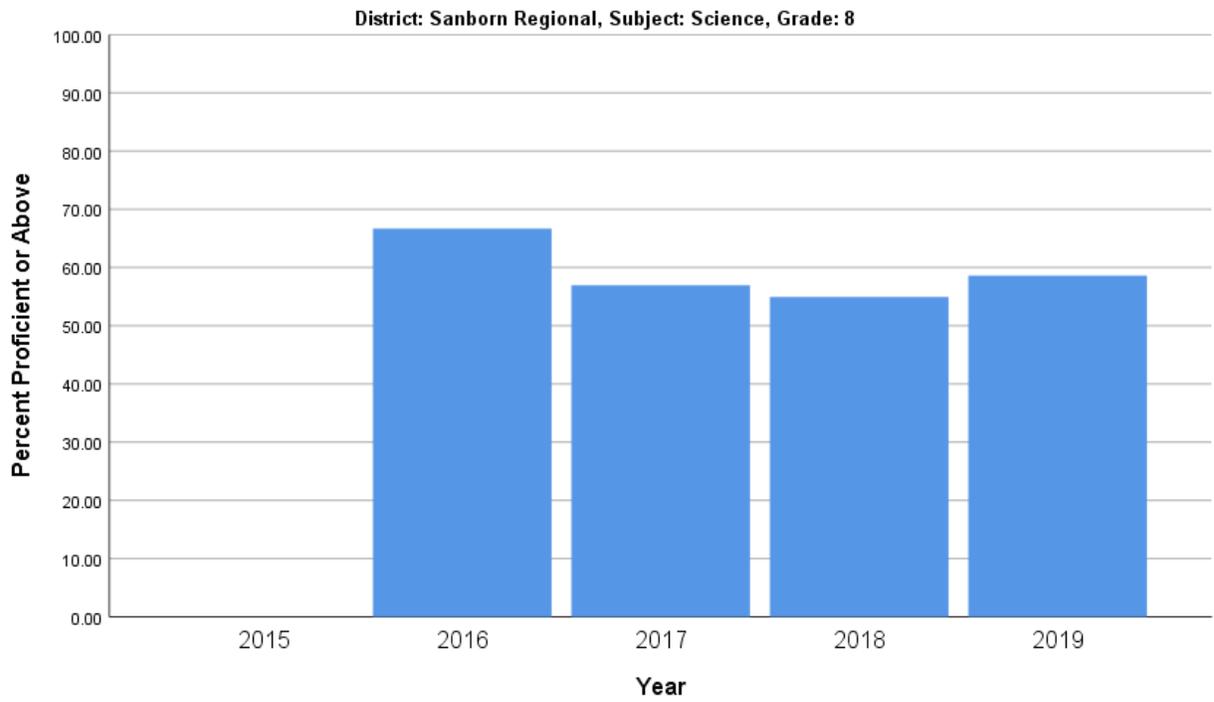
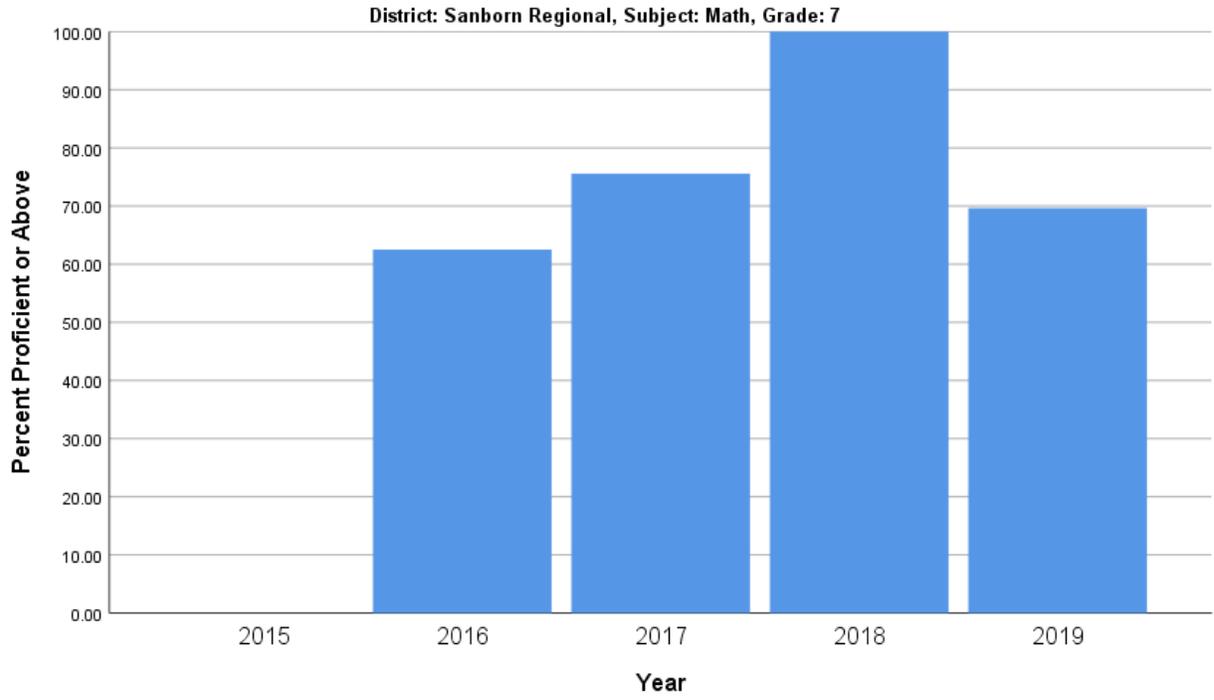


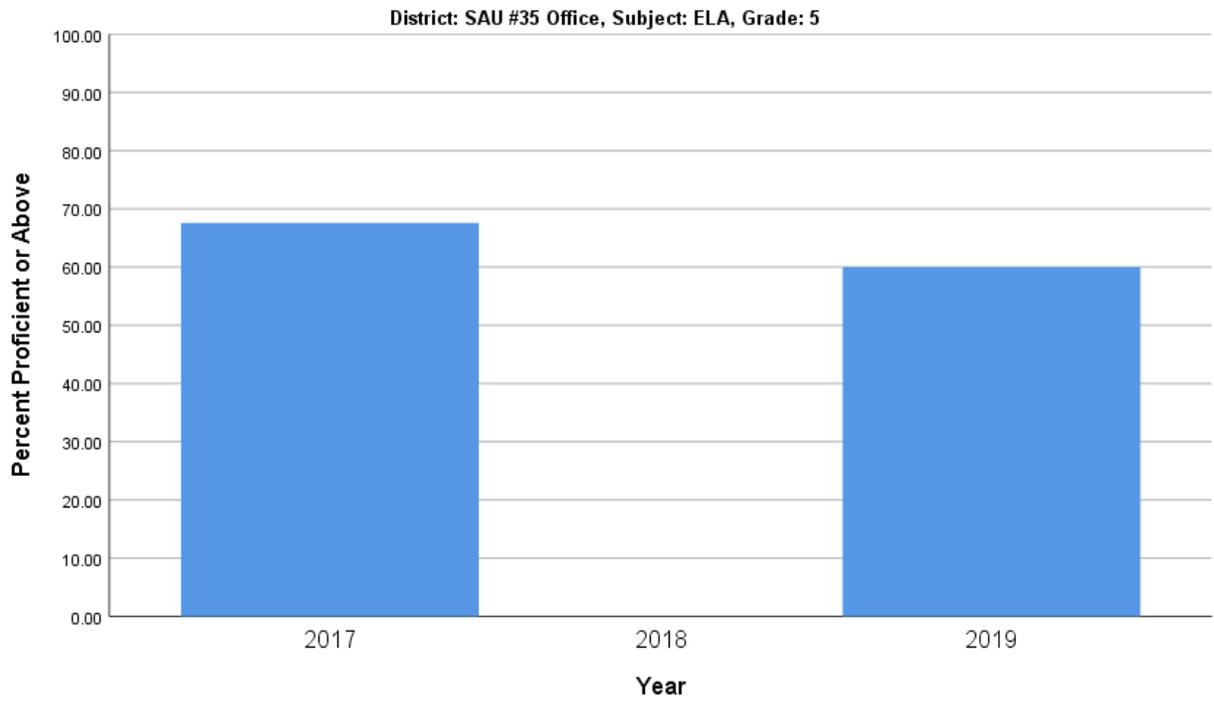
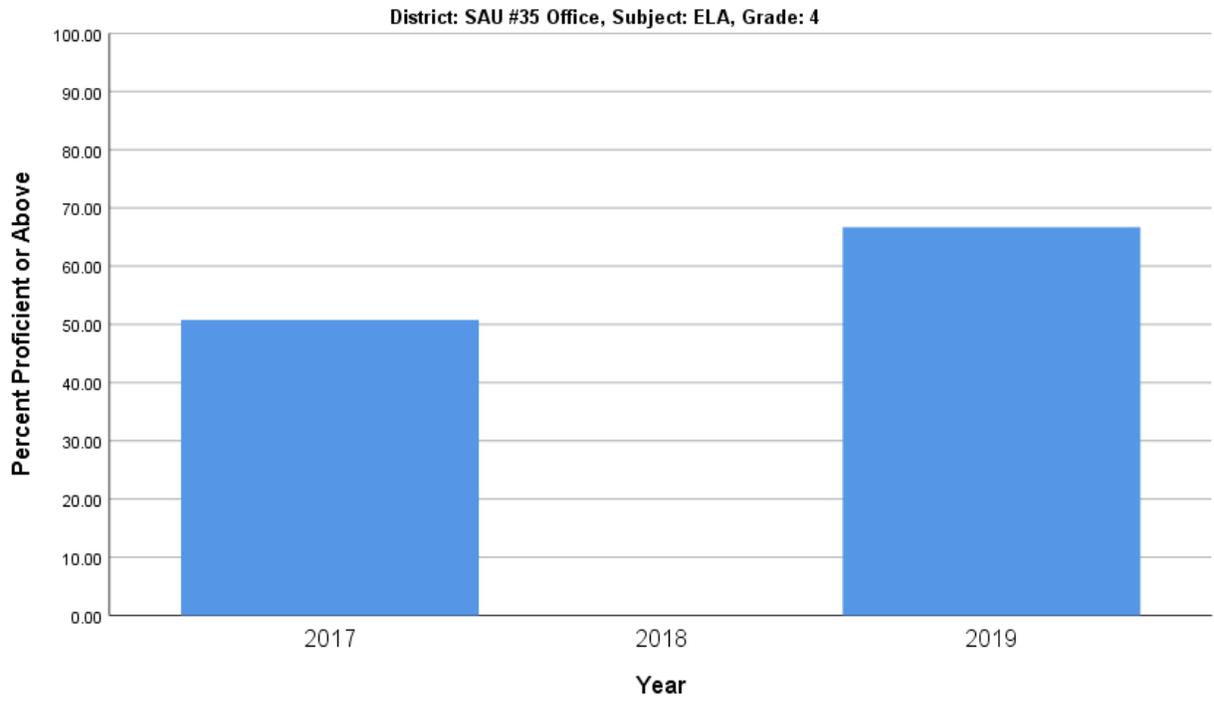
District: Sanborn Regional, Subject: Math, Grade: 5



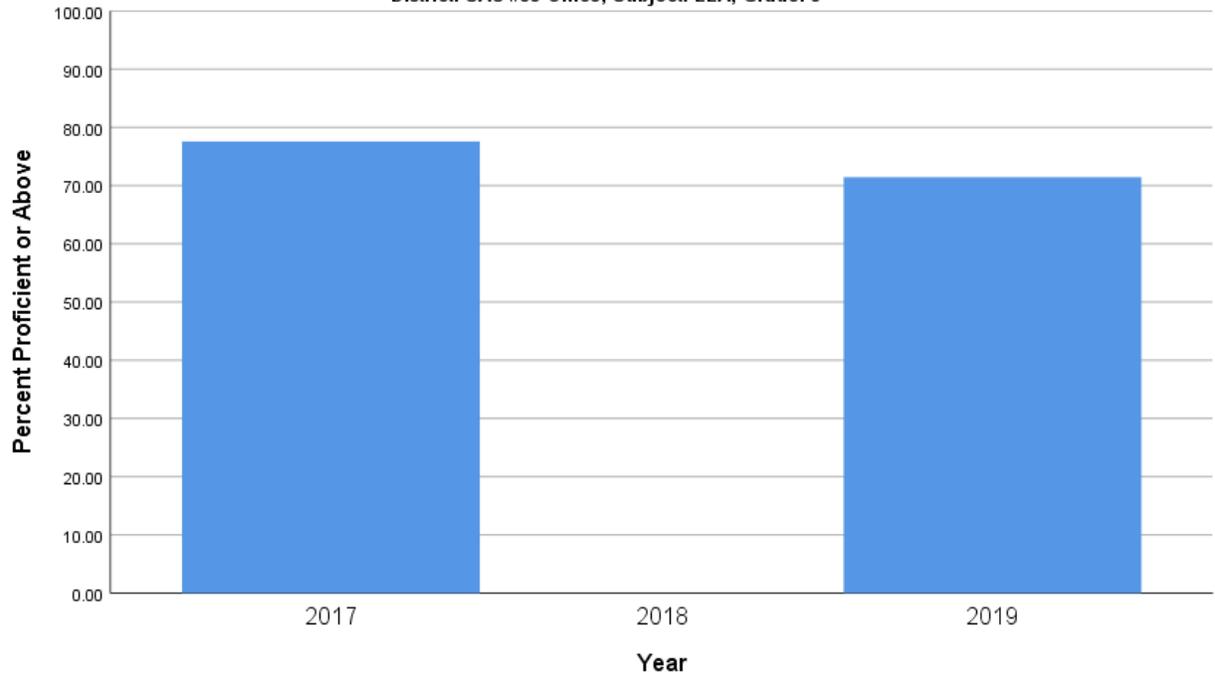
District: Sanborn Regional, Subject: Math, Grade: 6

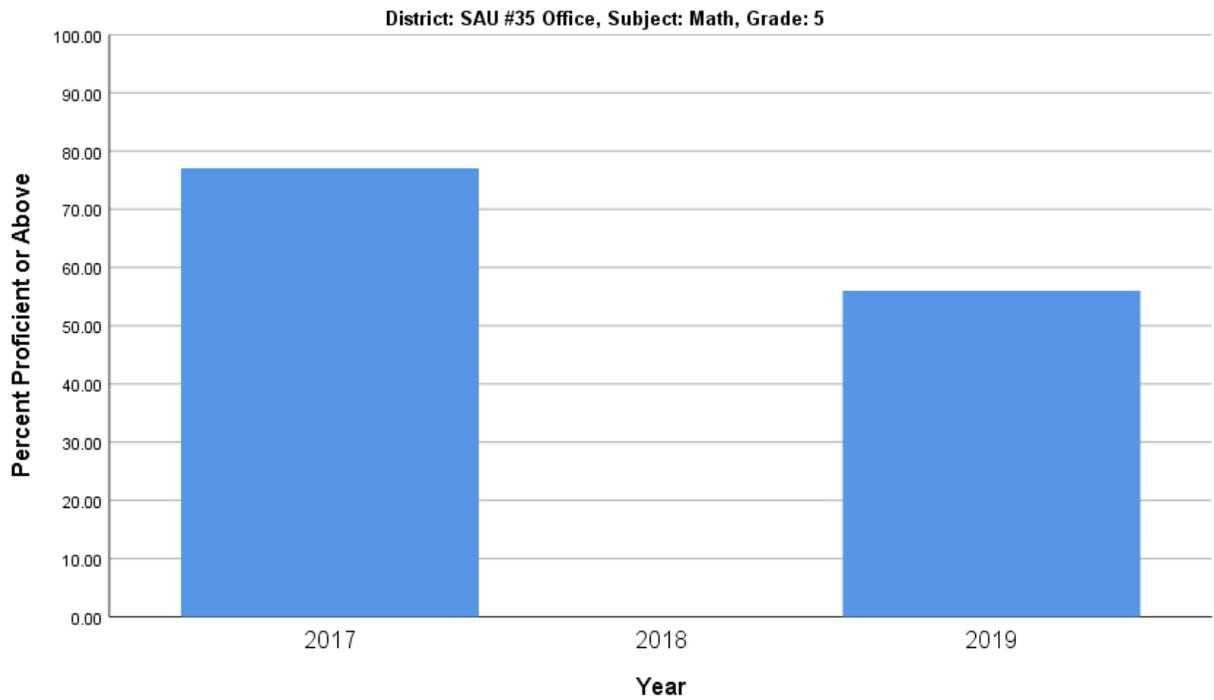
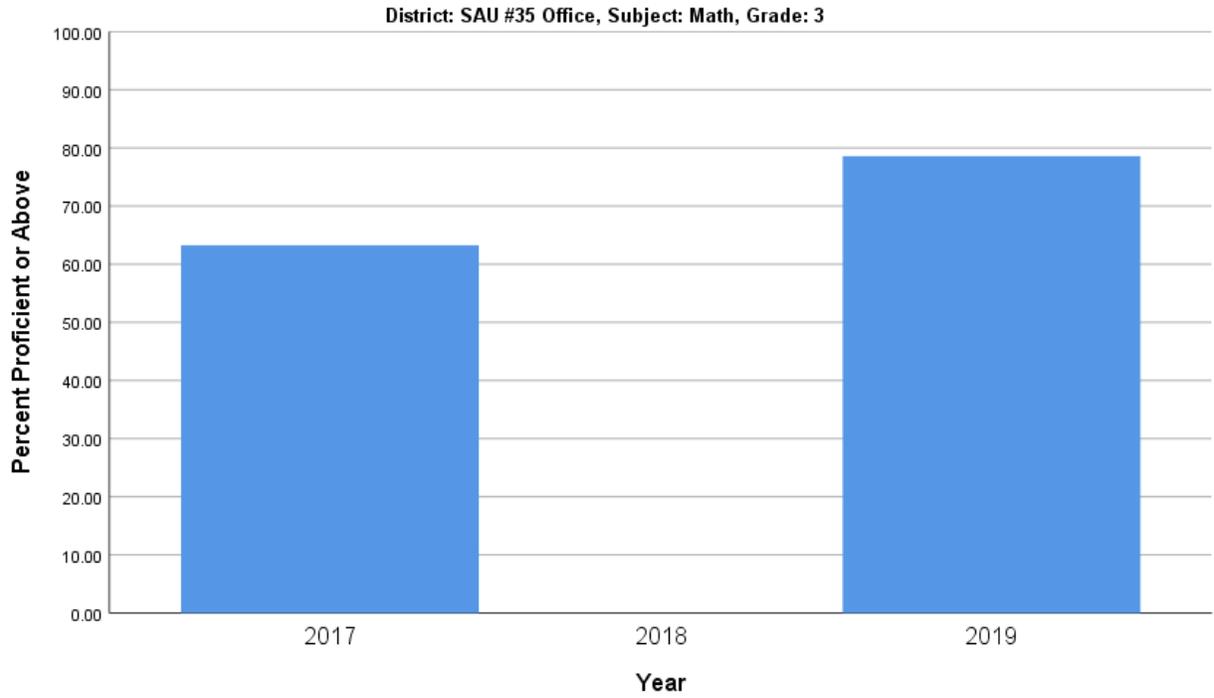




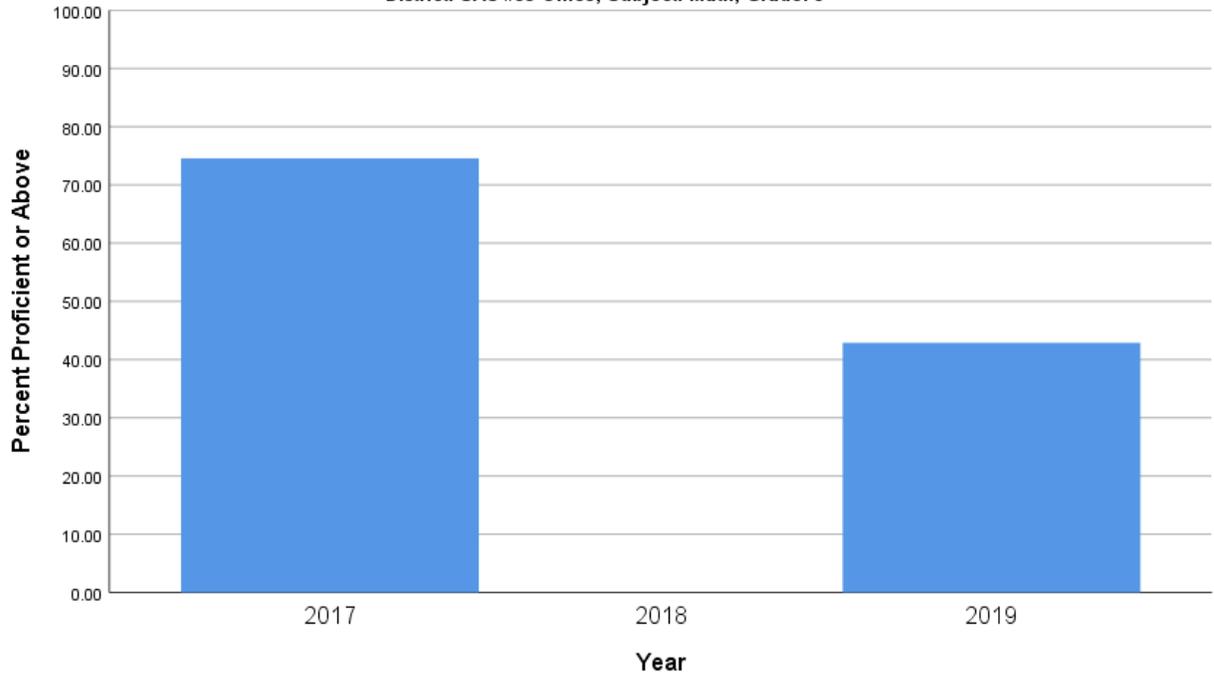


District: SAU #35 Office, Subject: ELA, Grade: 6

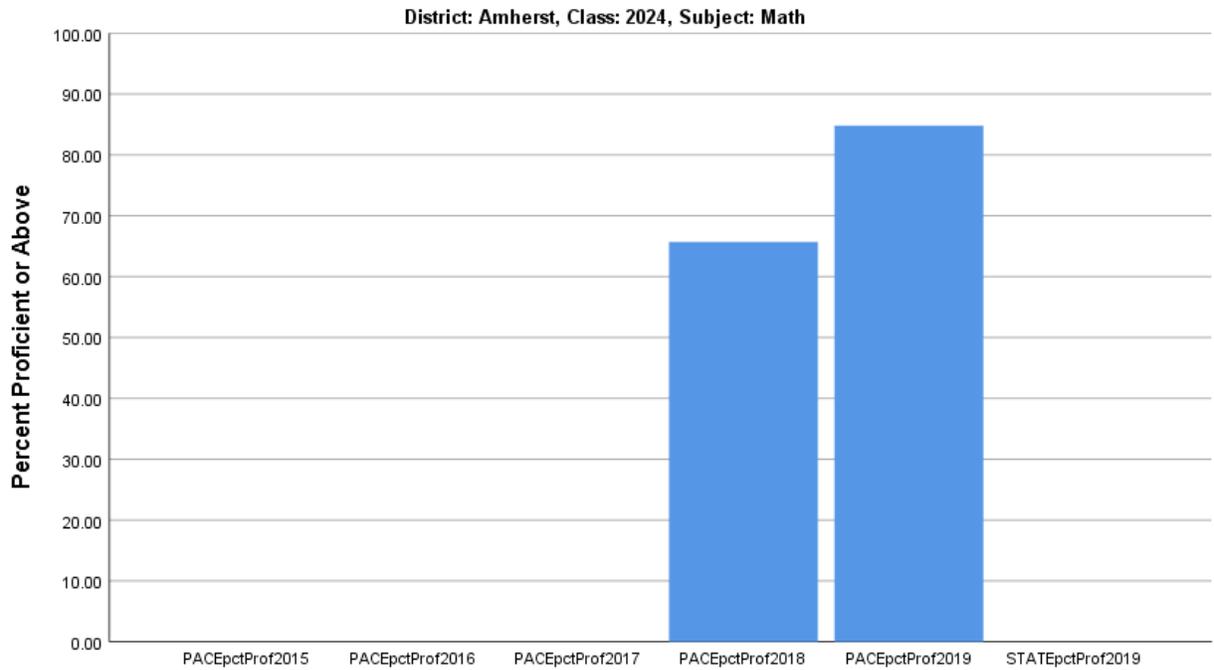
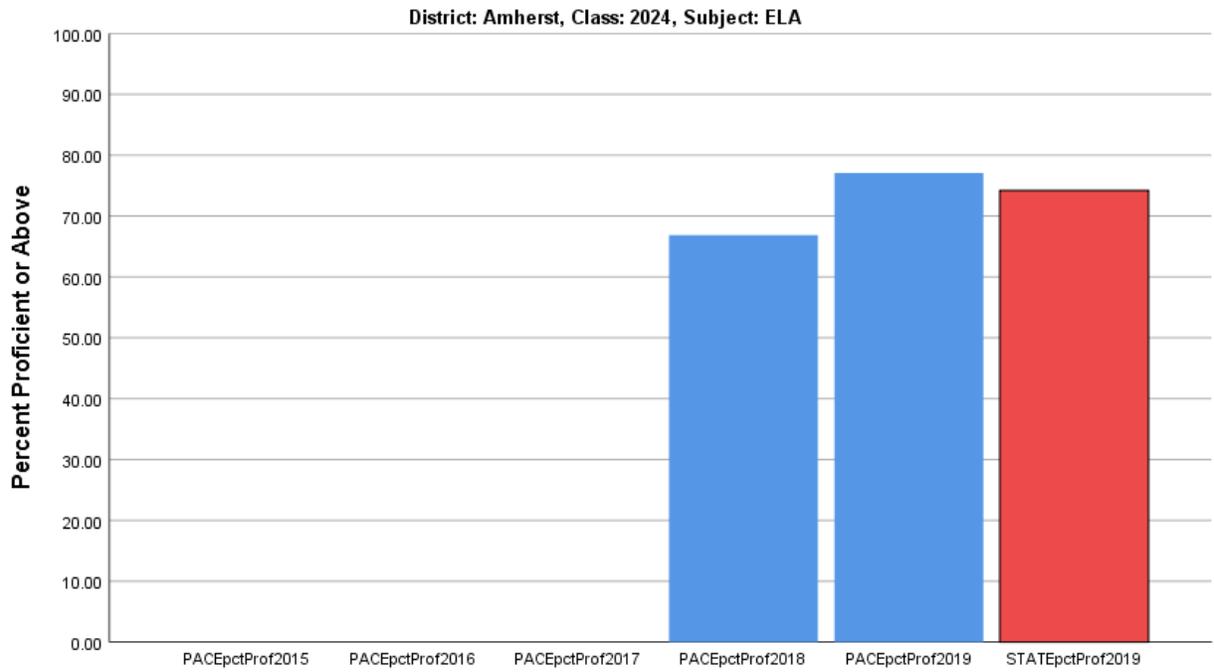




District: SAU #35 Office, Subject: Math, Grade: 6

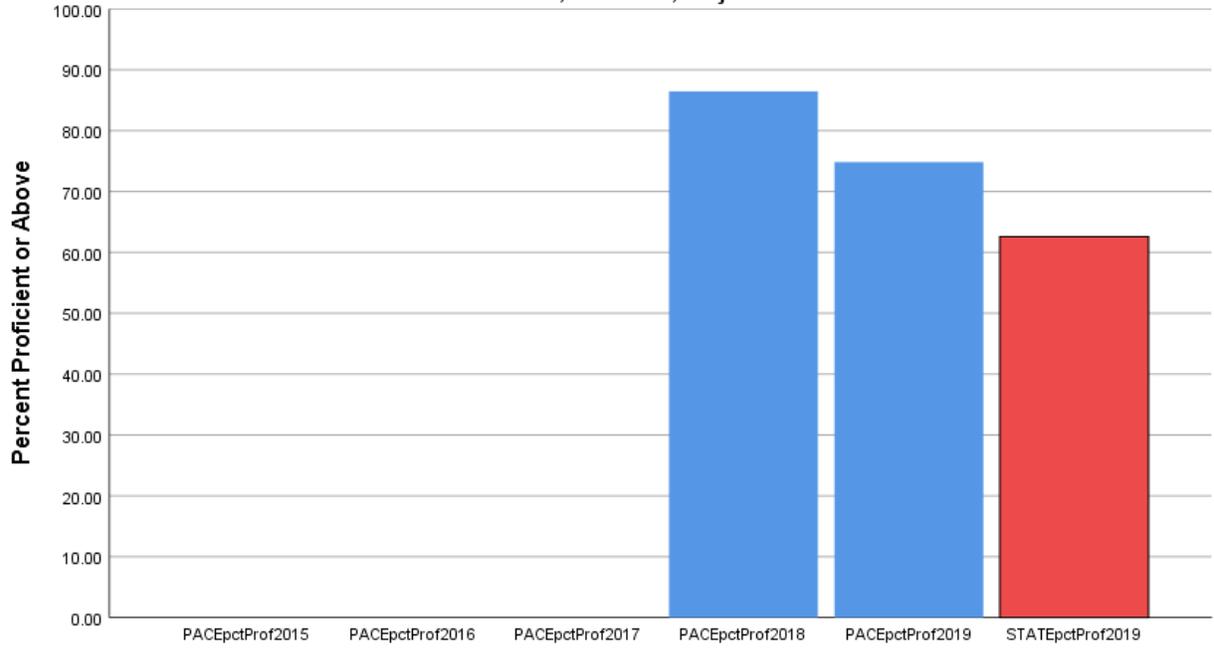


Longitudinal Analysis by District⁵

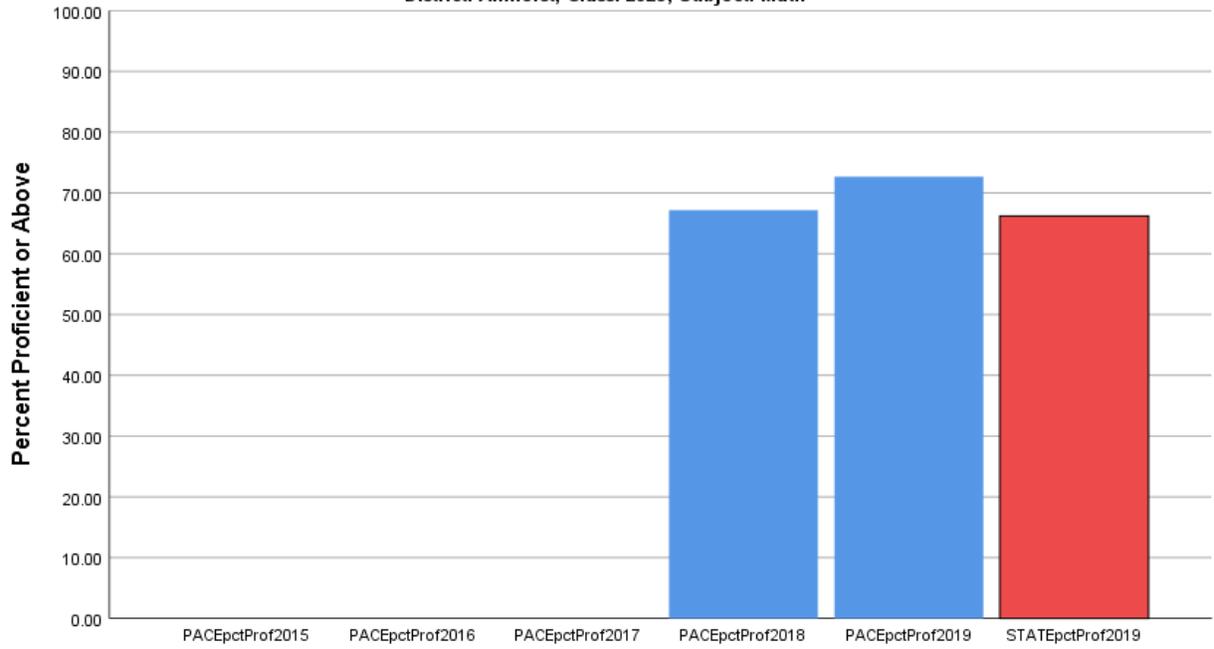


⁵ Only graduation classes with district by subject combinations with at least 2019 and one other year of data are included.

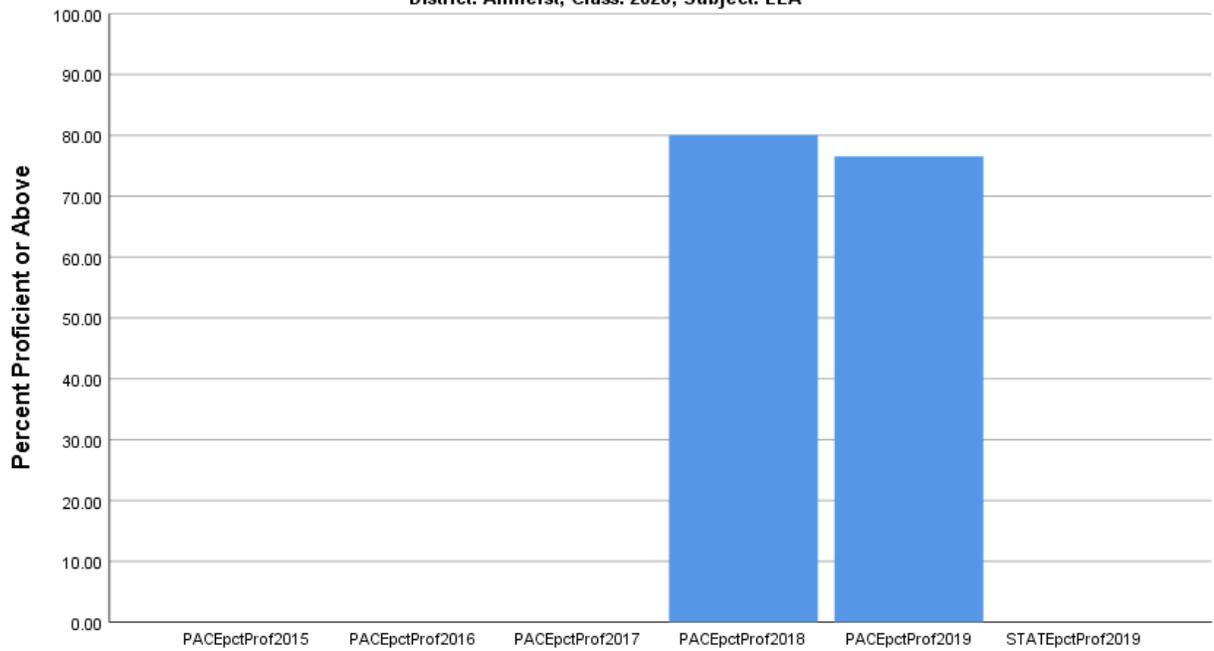
District: Amherst, Class: 2025, Subject: ELA



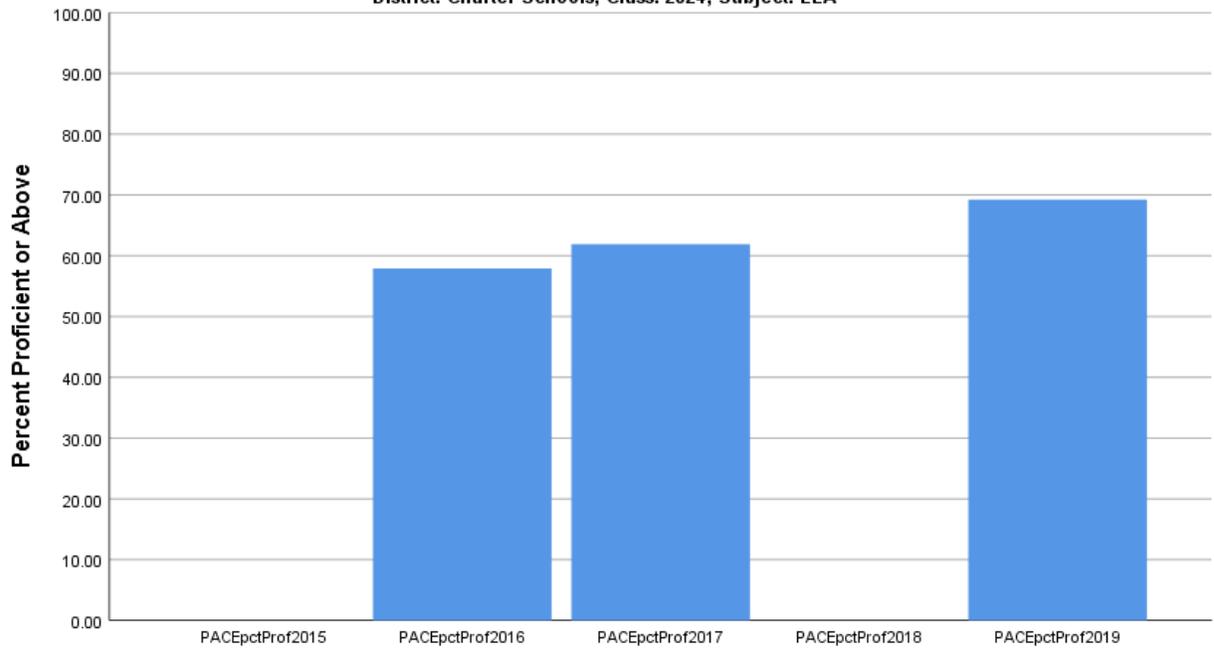
District: Amherst, Class: 2025, Subject: Math



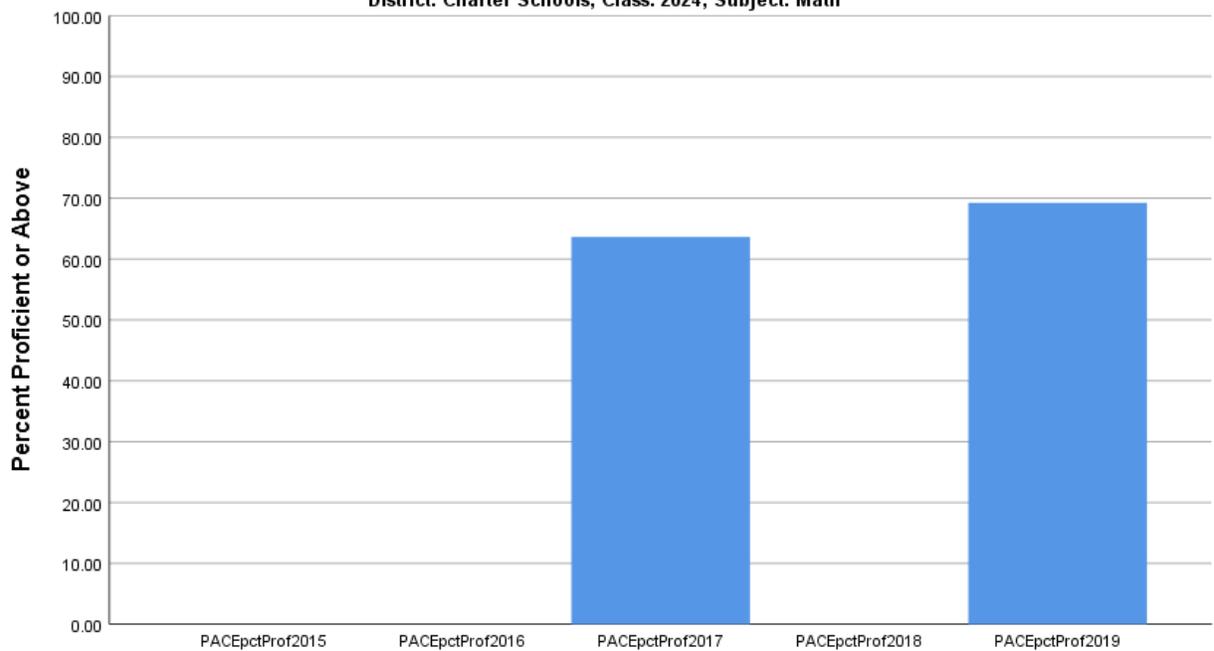
District: Amherst, Class: 2026, Subject: ELA



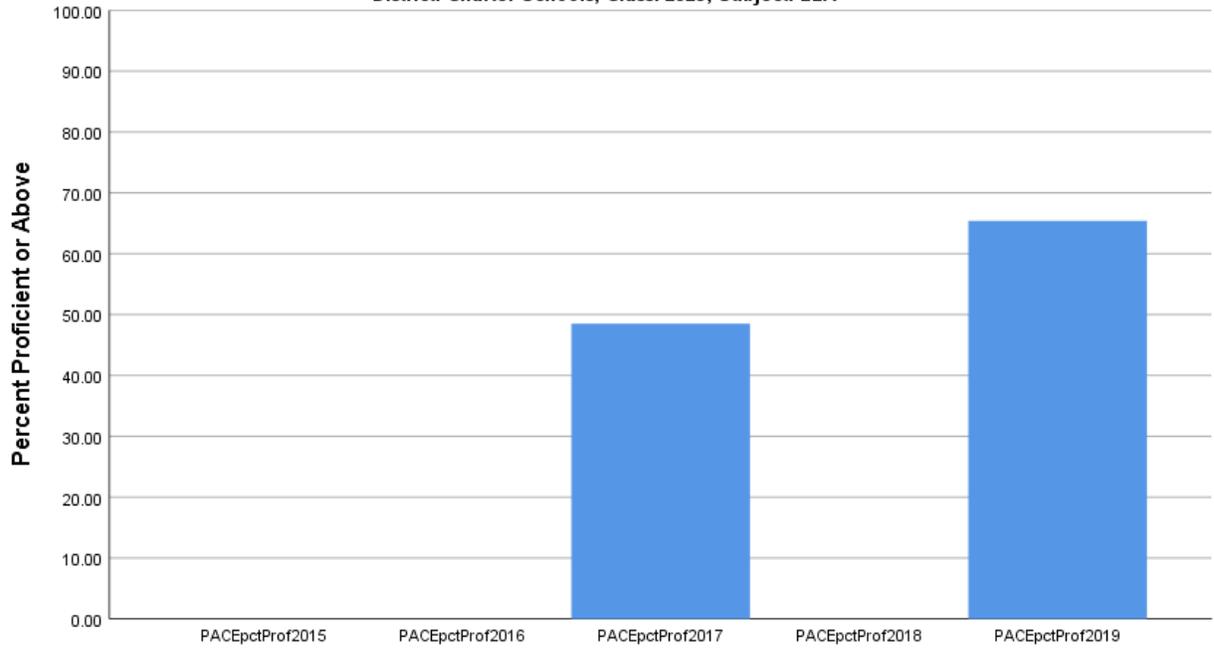
District: Charter Schools, Class: 2024, Subject: ELA



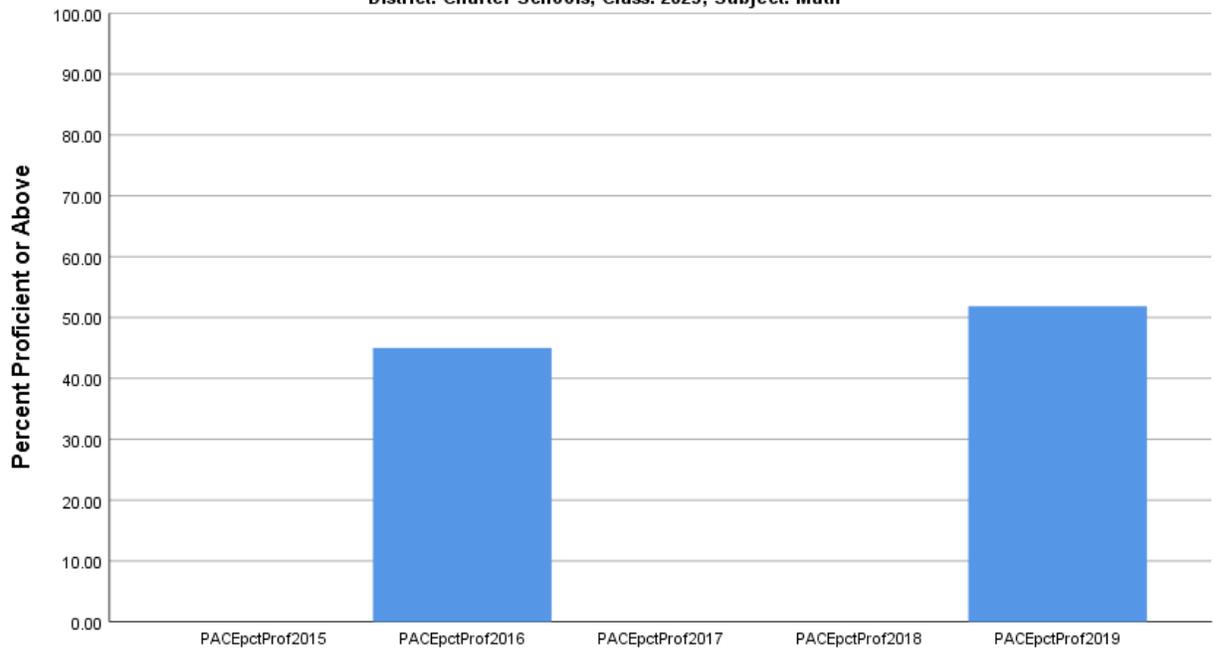
District: Charter Schools, Class: 2024, Subject: Math



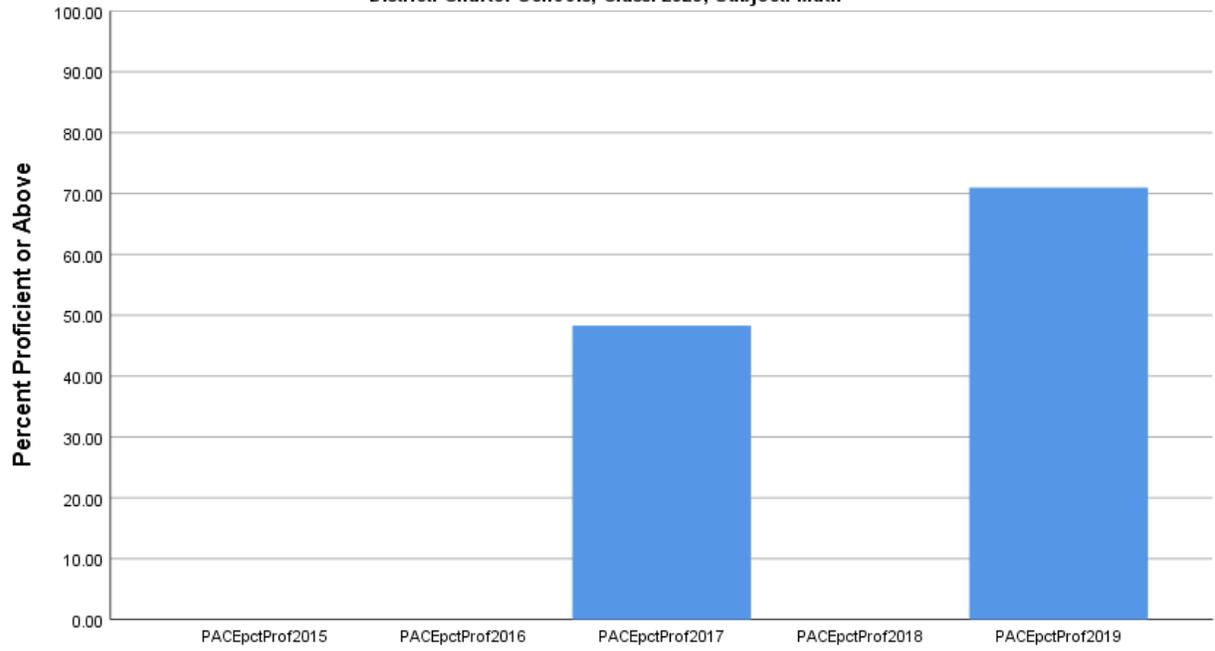
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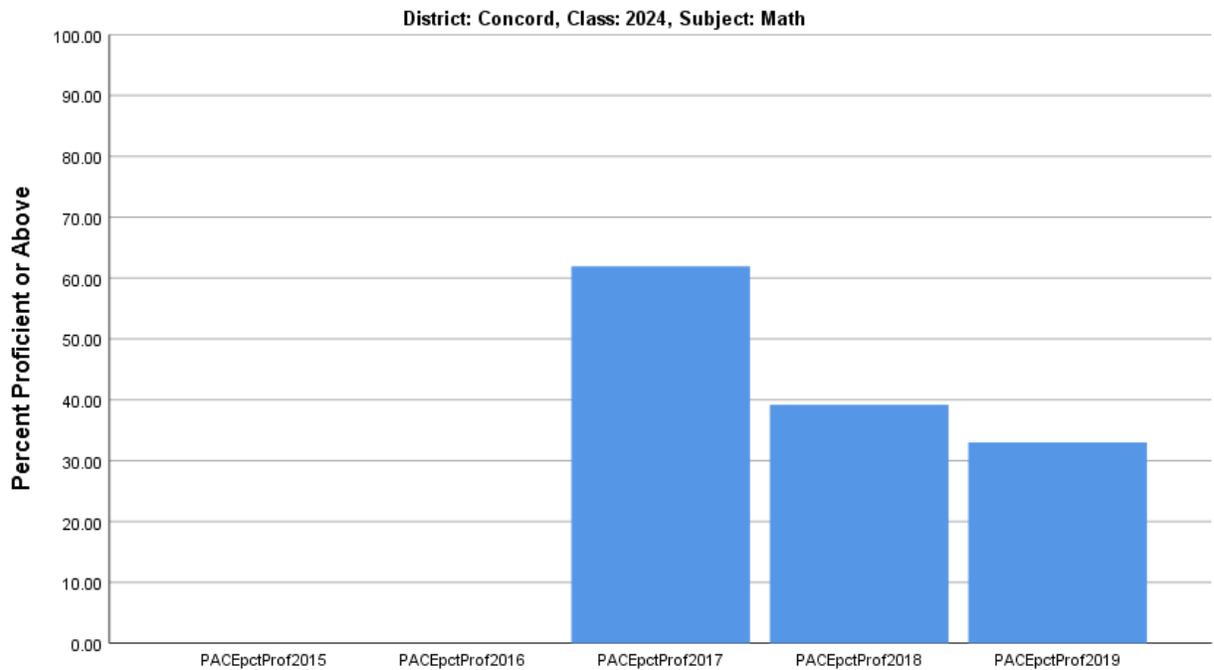
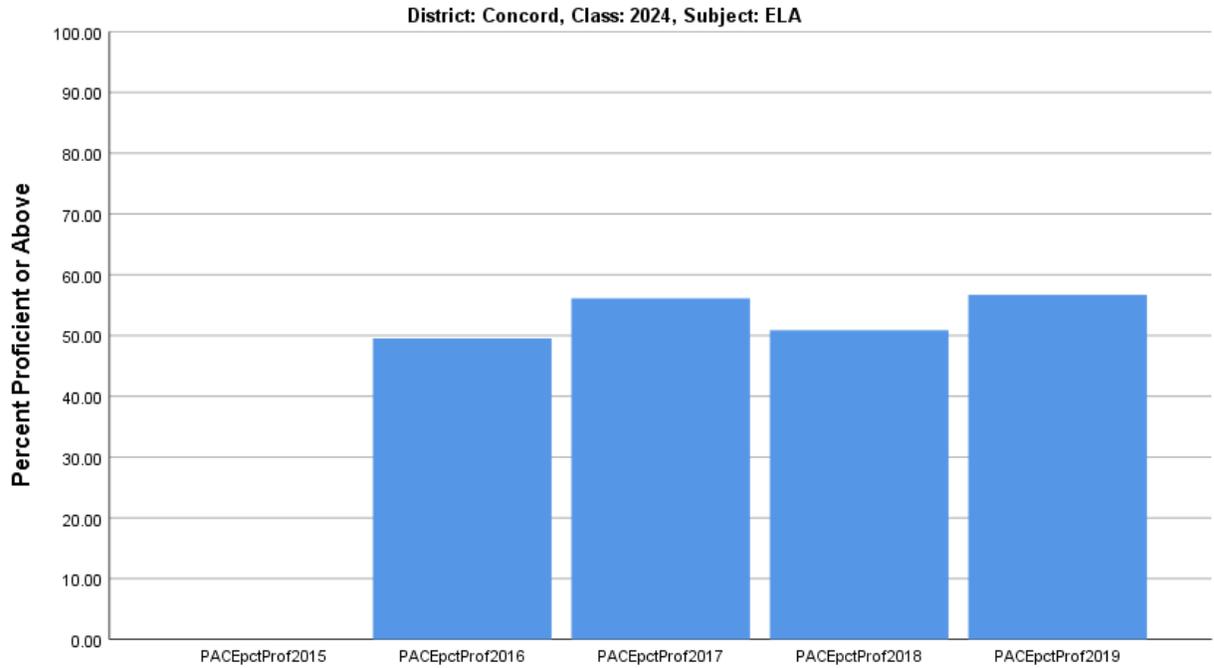


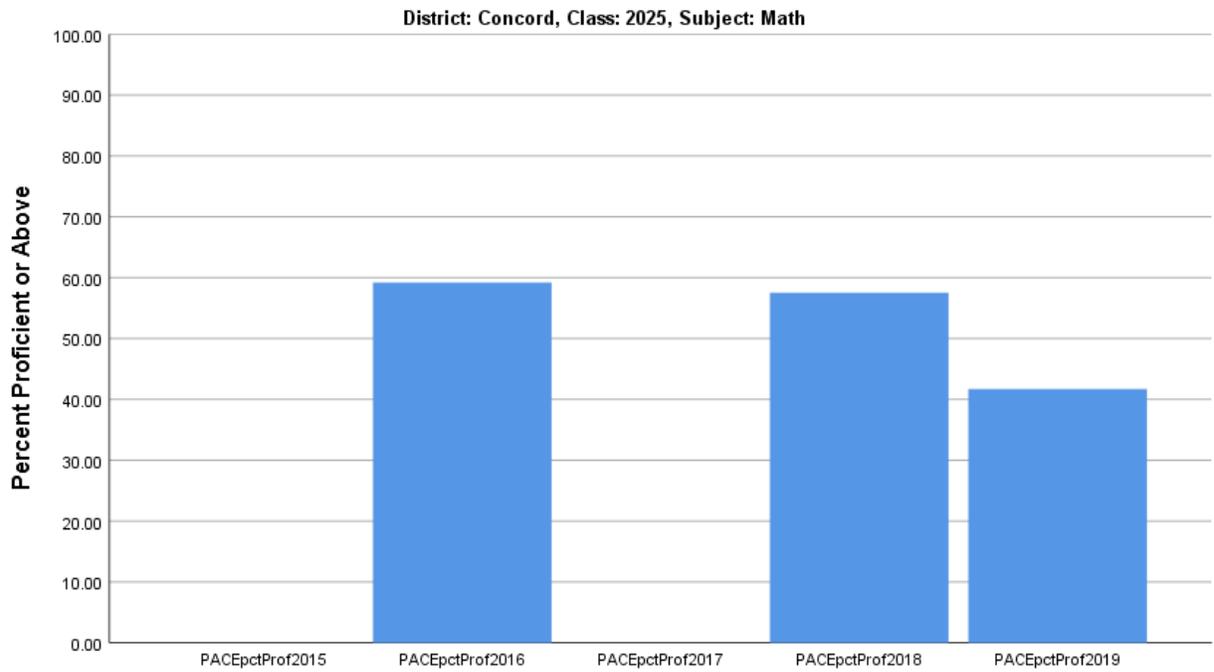
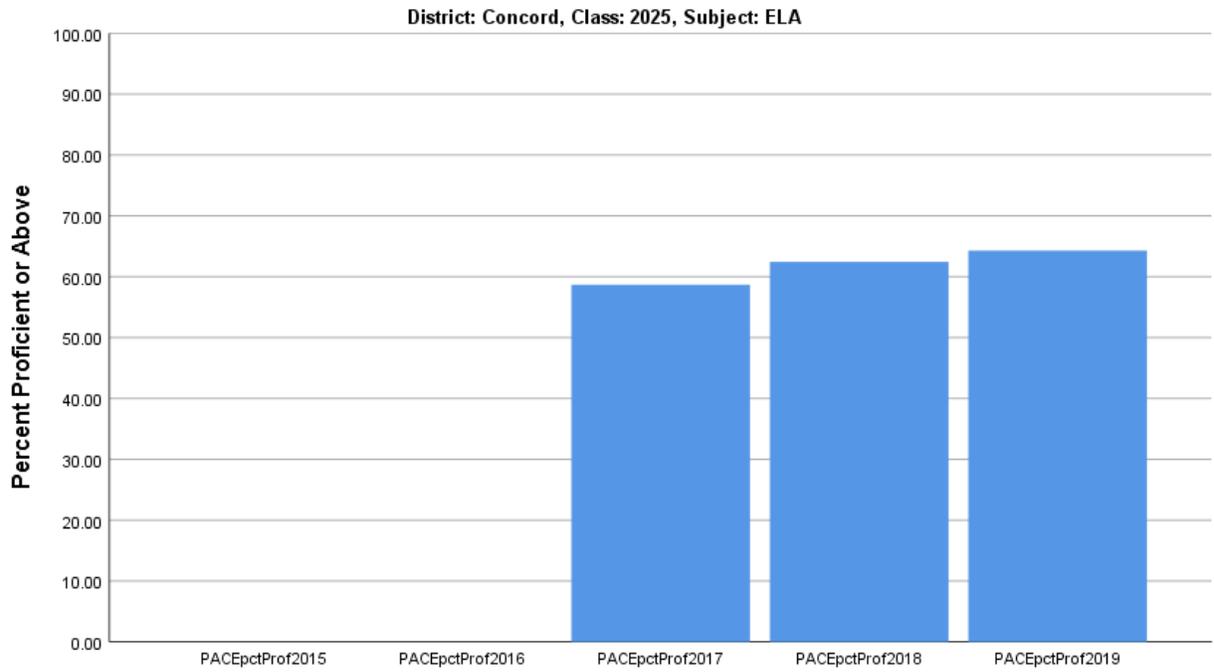
District: Charter Schools, Class: 2025, Subject: Math



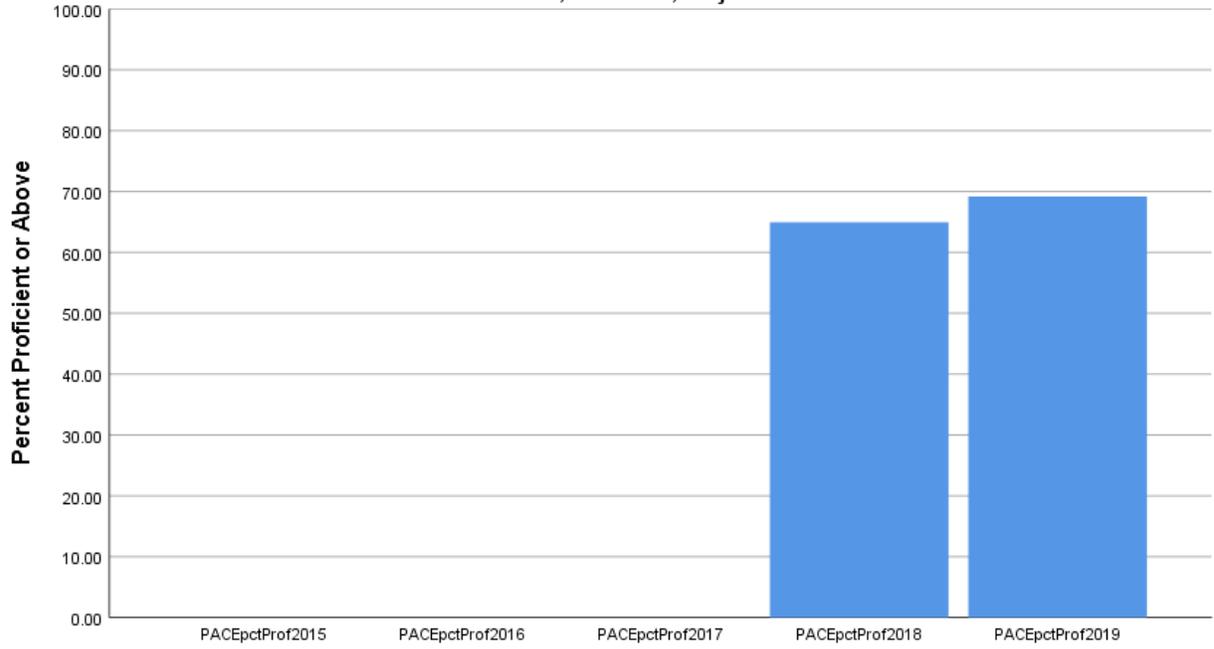
District: Charter Schools, Class: 2026, Subject: Math



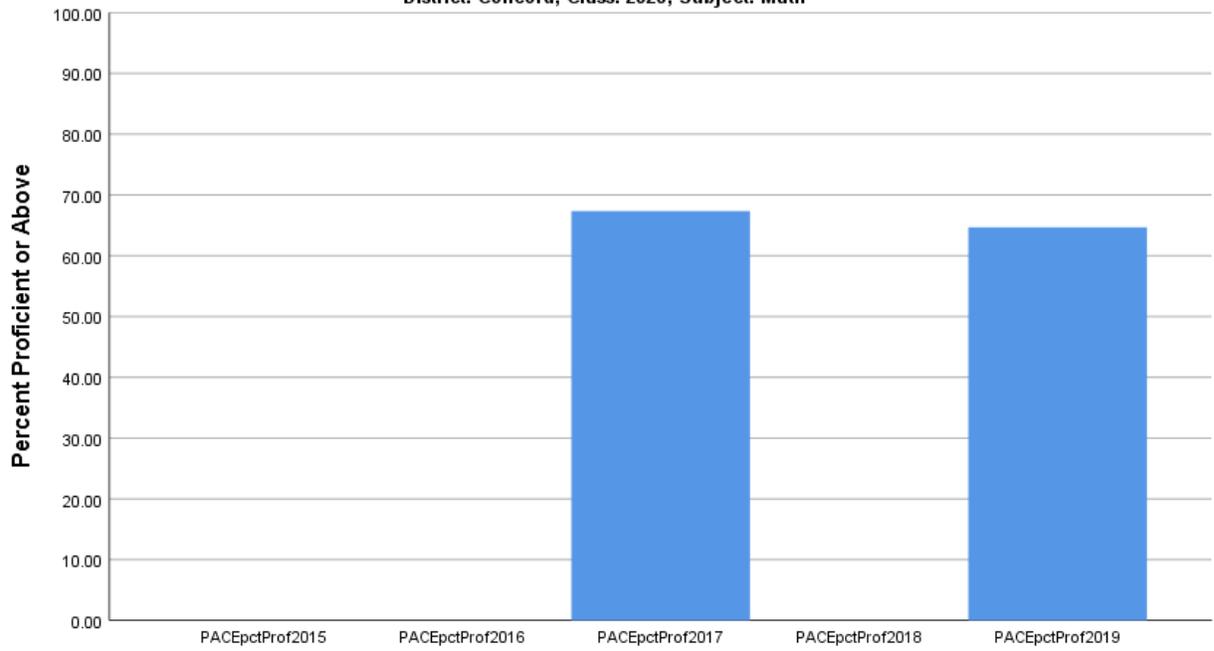


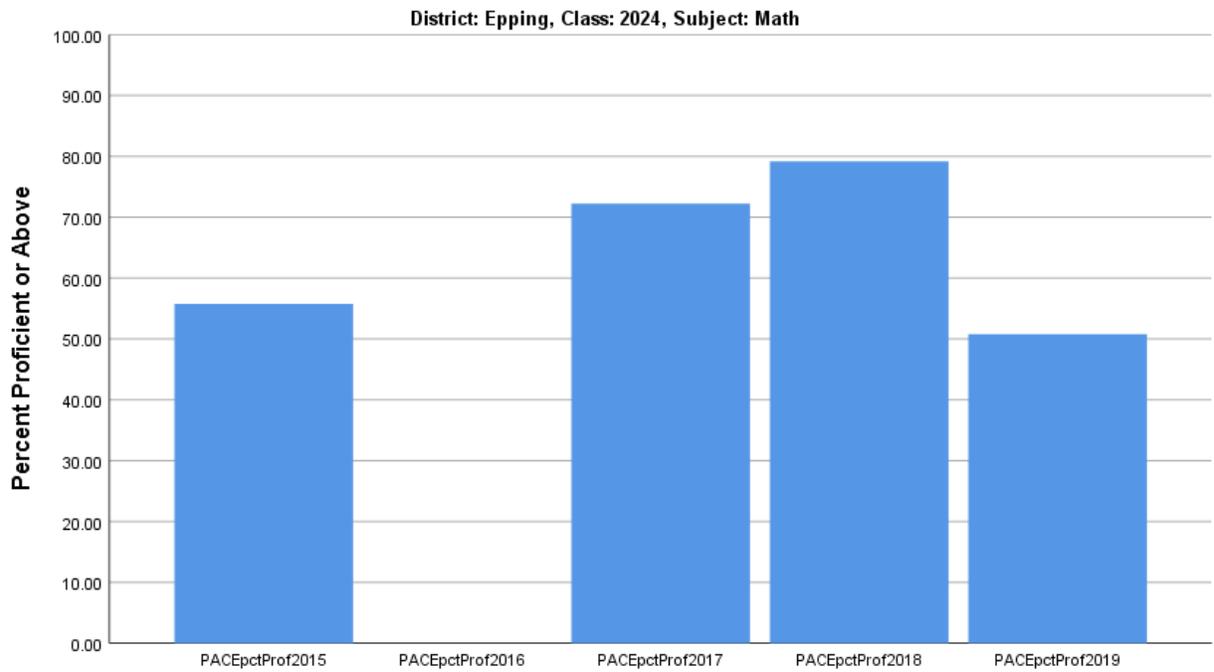
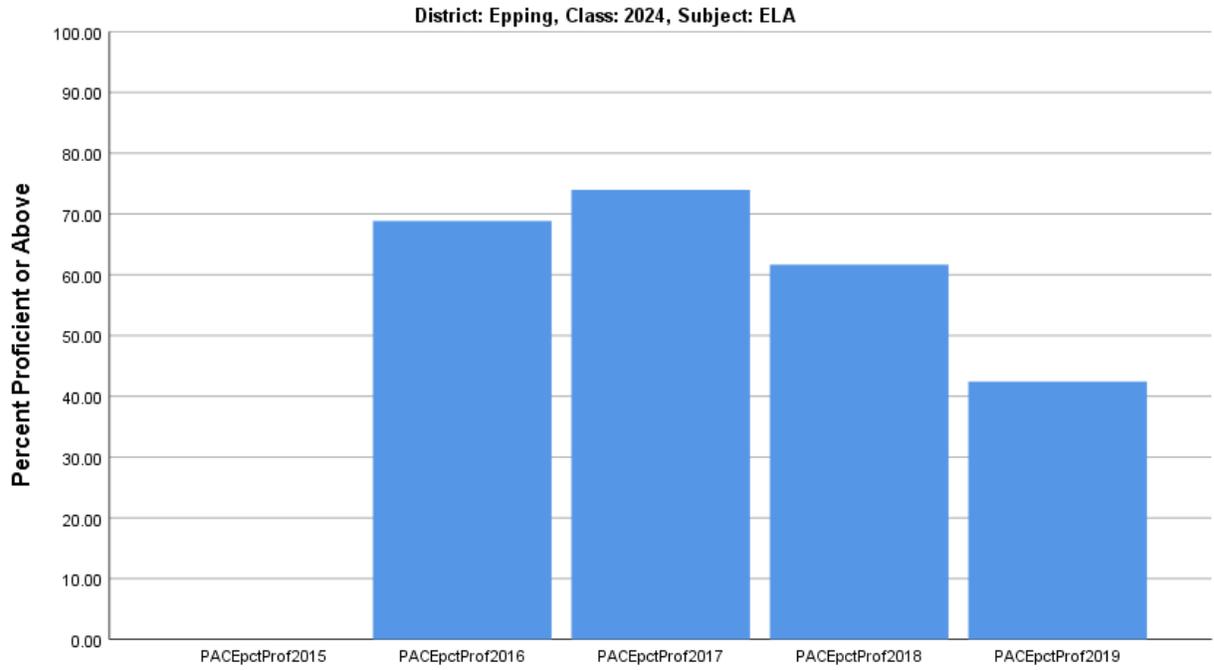


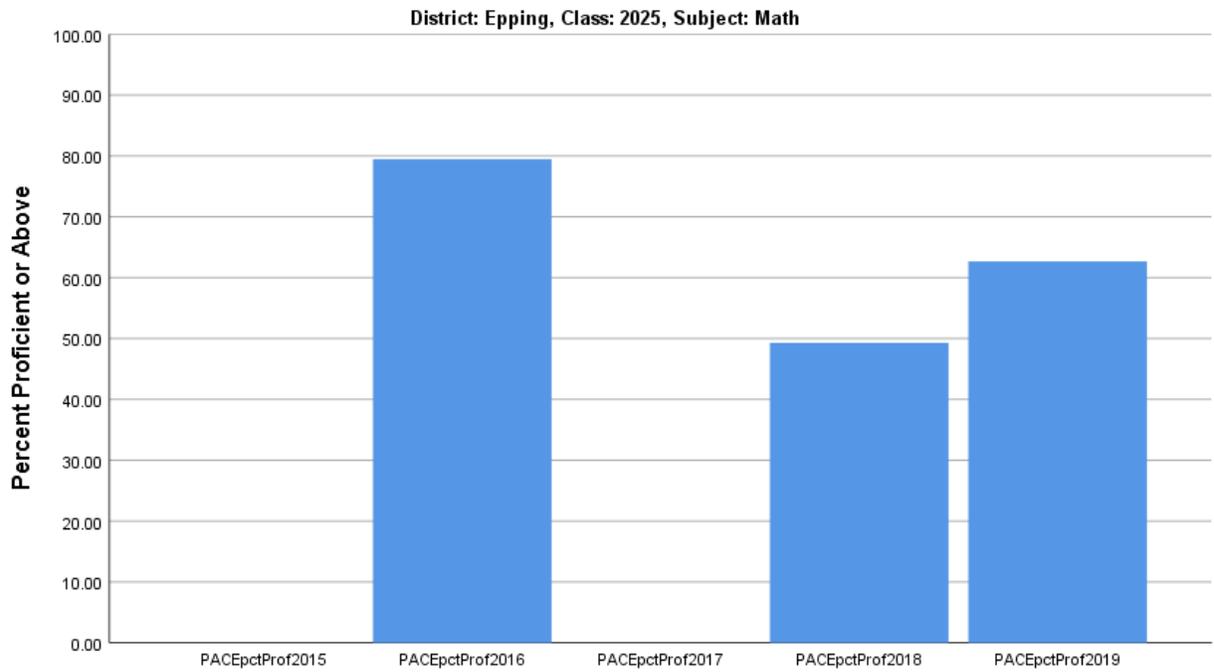
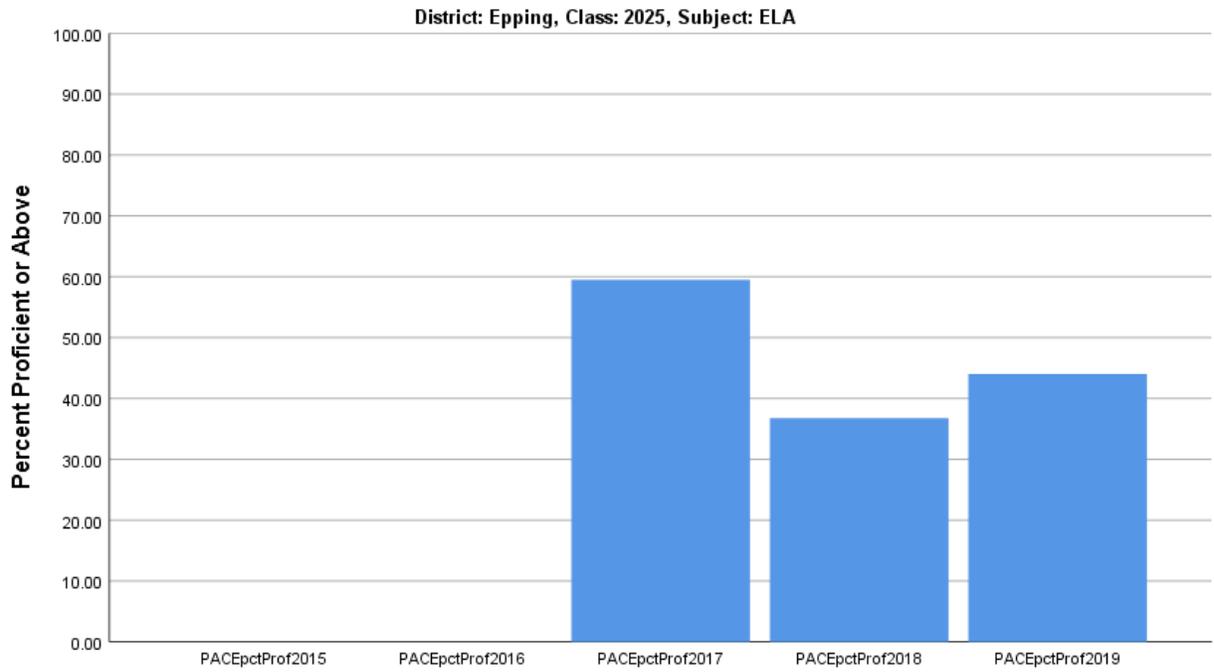
District: Concord, Class: 2026, Subject: ELA



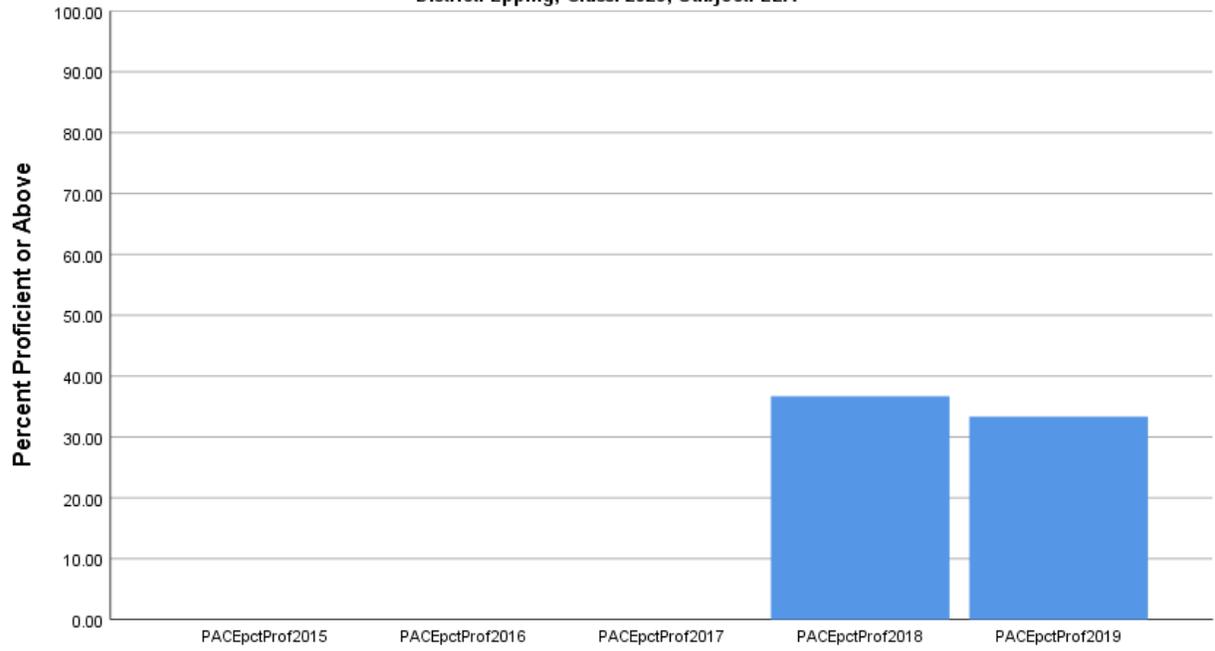
District: Concord, Class: 2026, Subject: Math

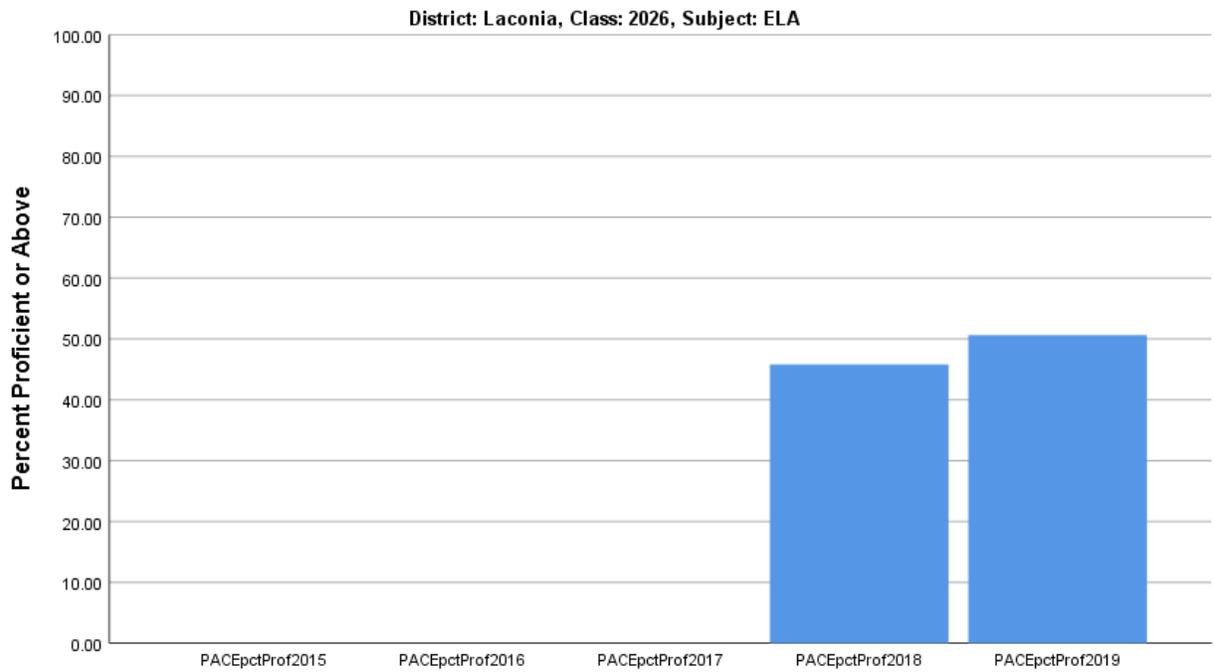
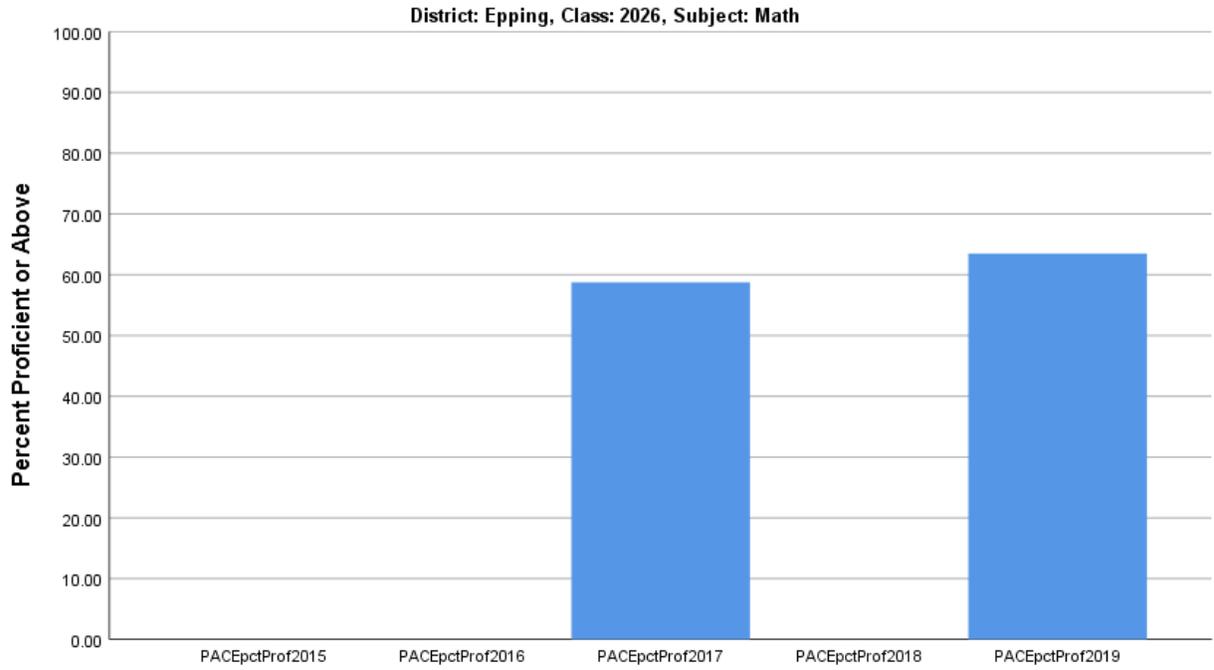




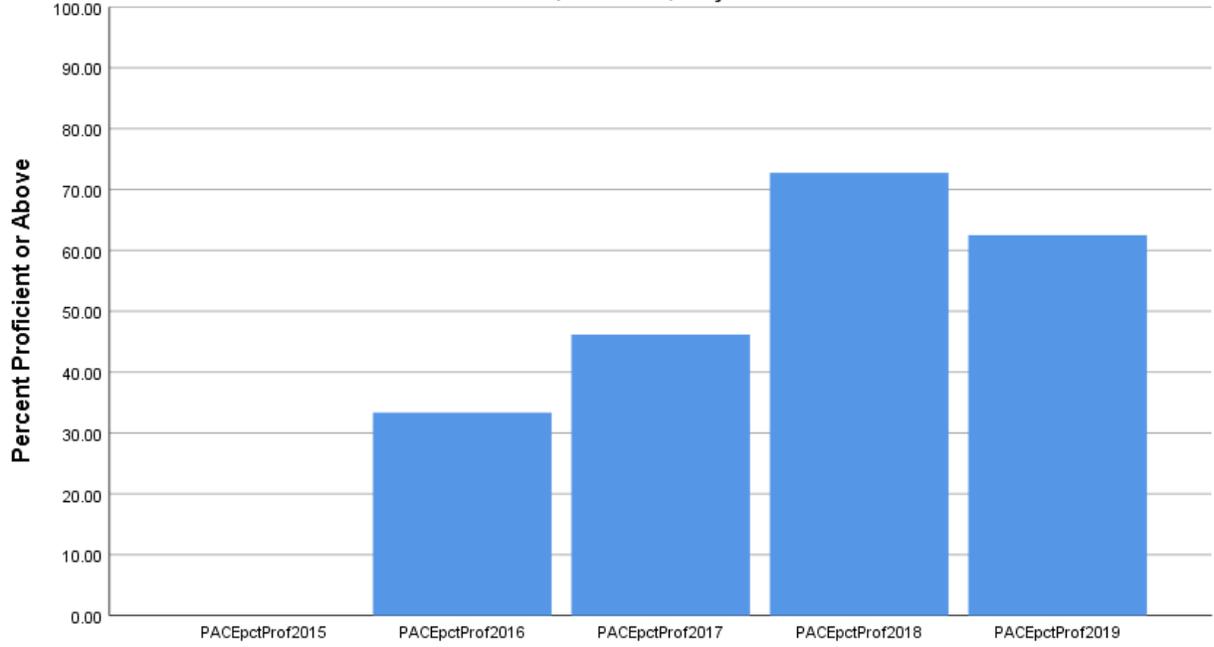


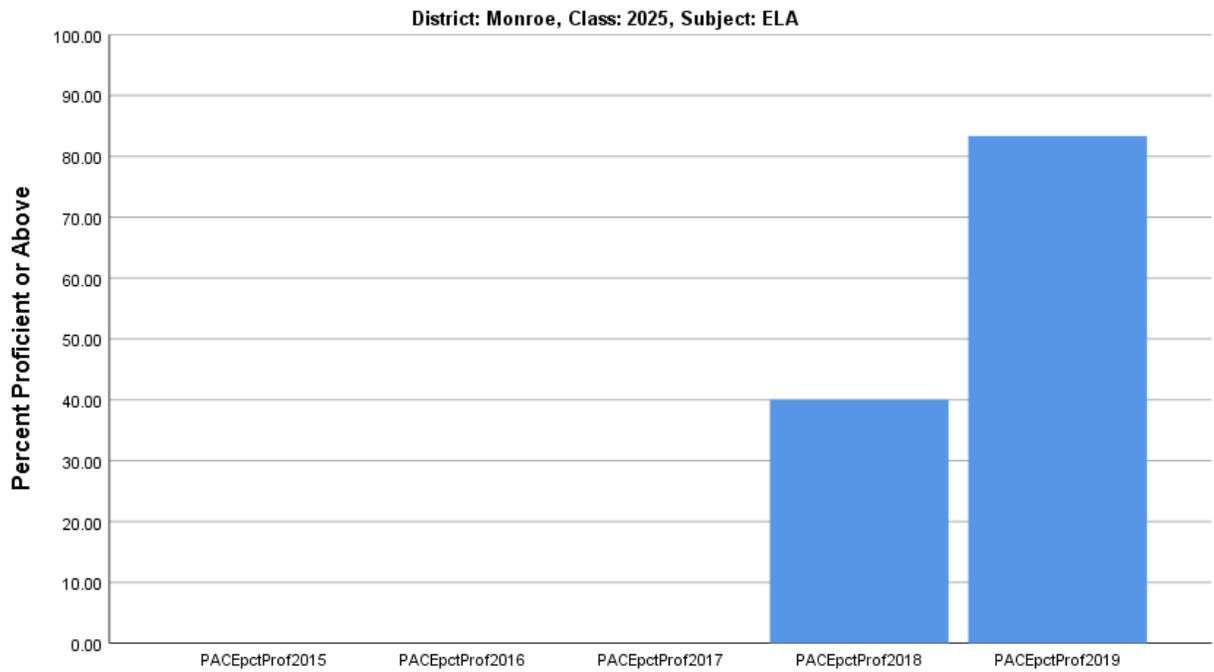
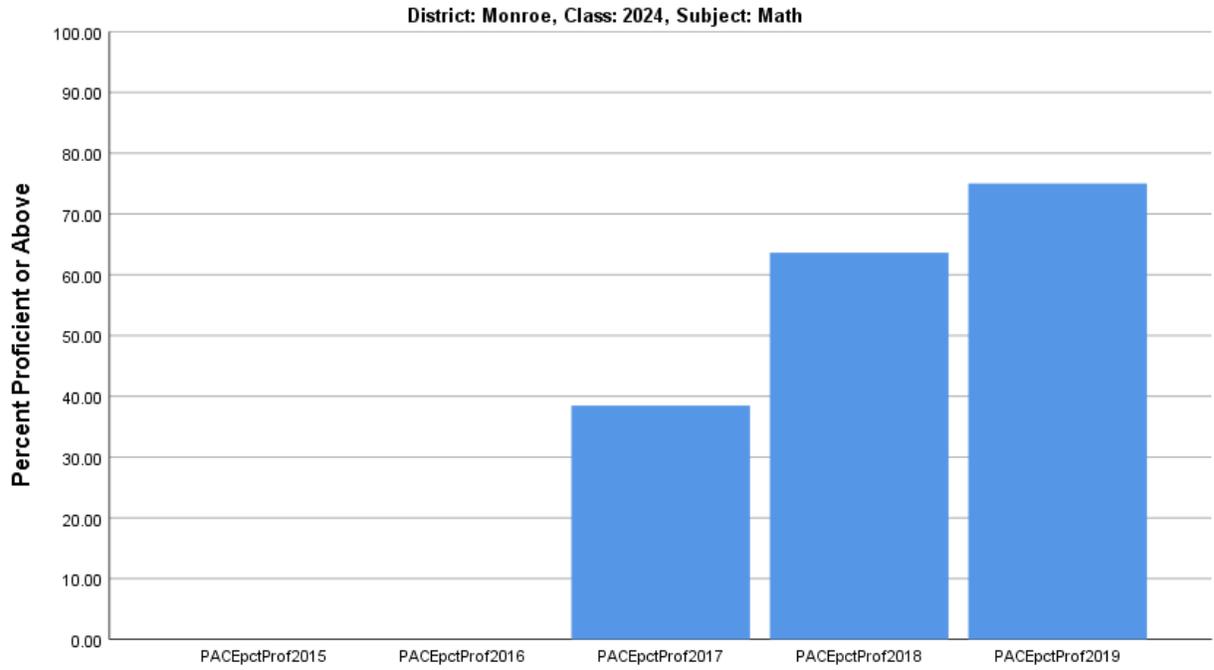
District: Epping, Class: 2026, Subject: ELA

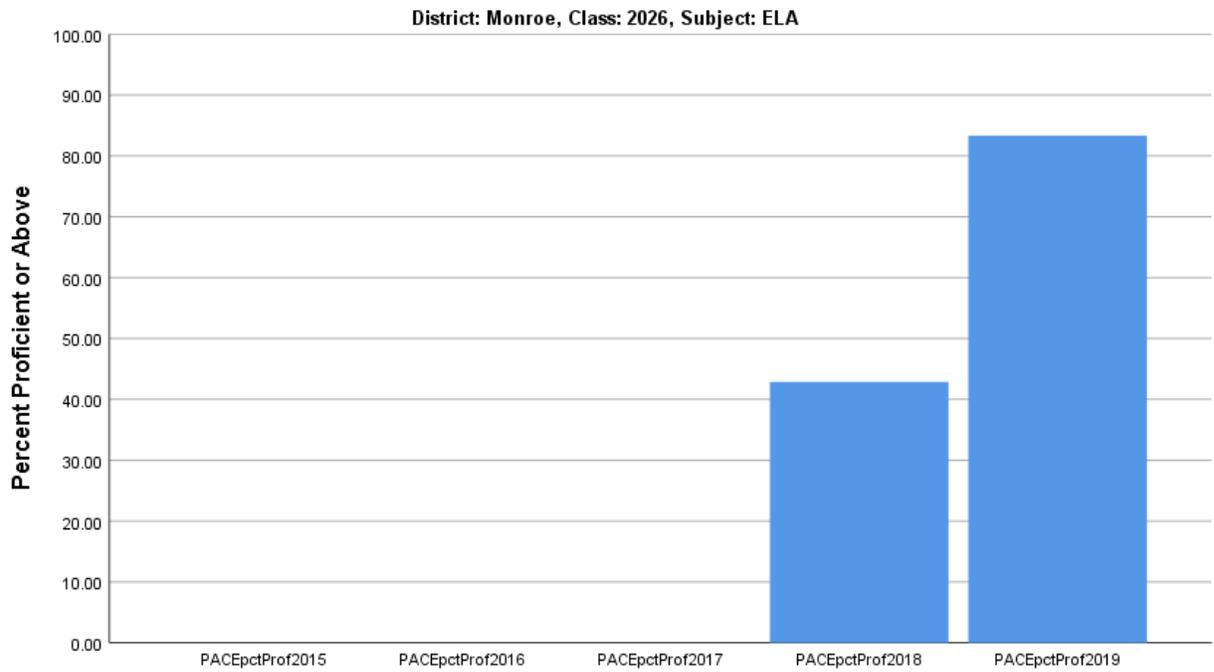
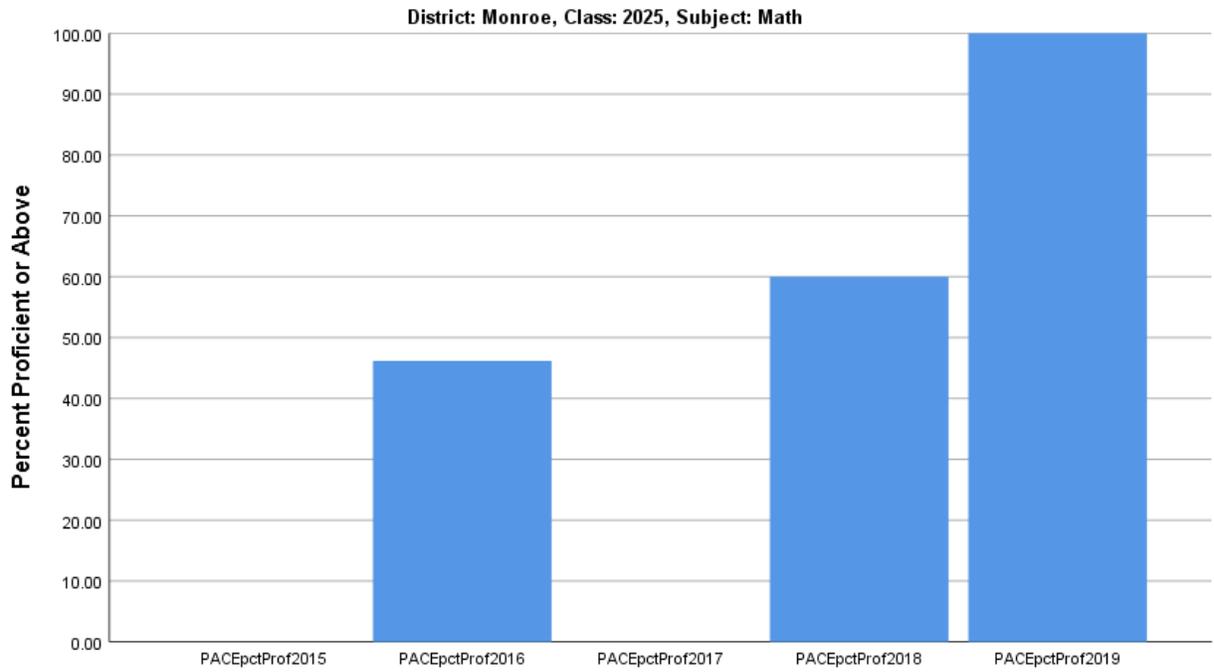




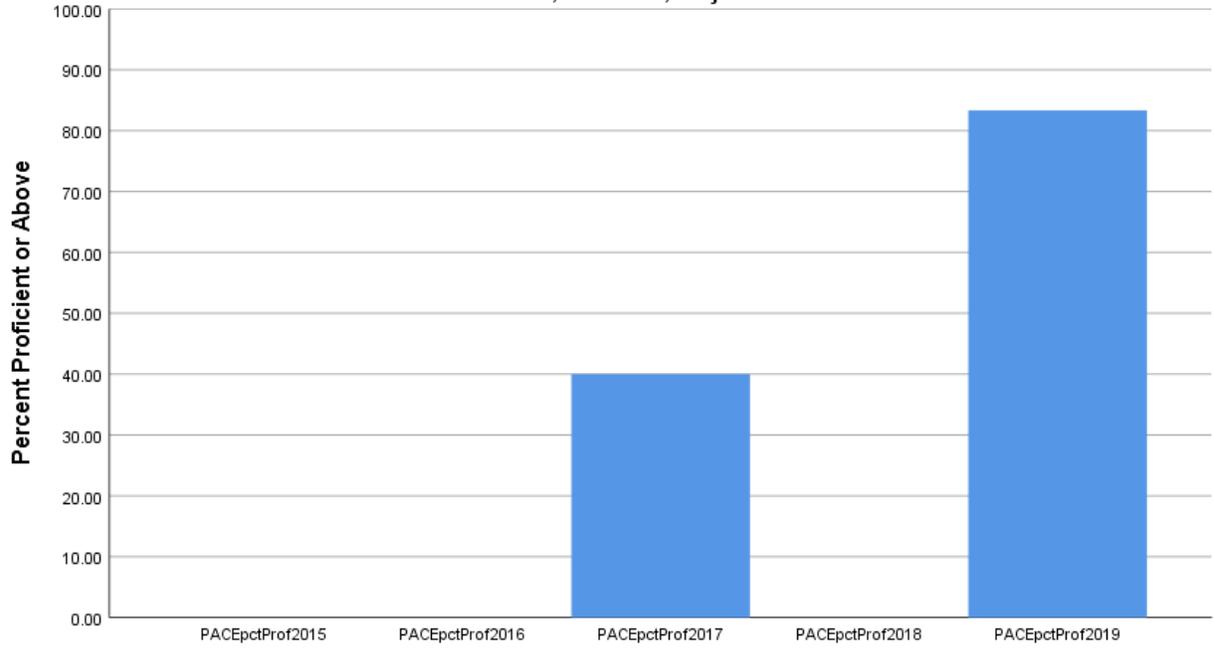
District: Monroe, Class: 2024, Subject: ELA



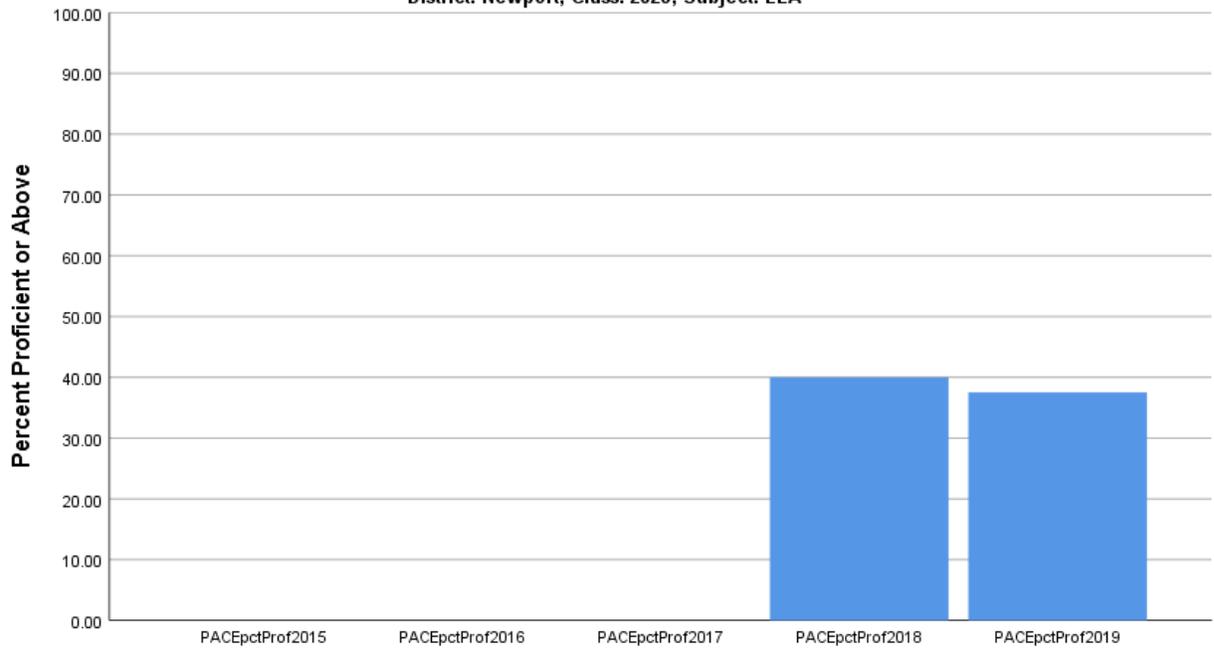




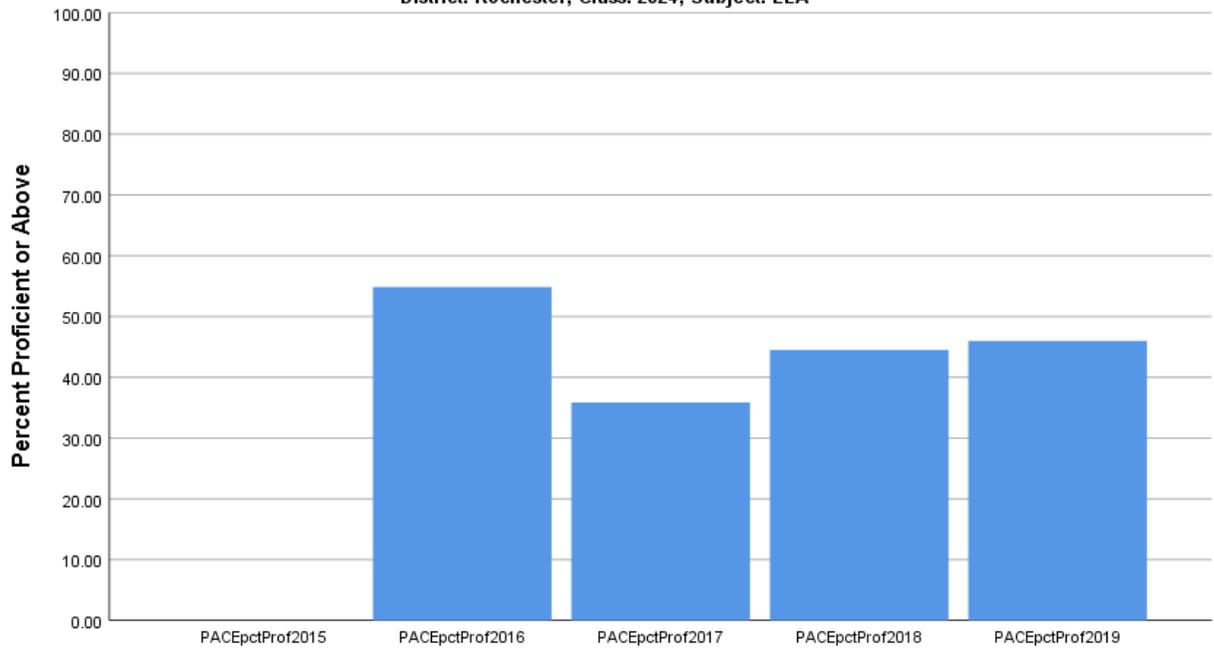
District: Monroe, Class: 2026, Subject: Math



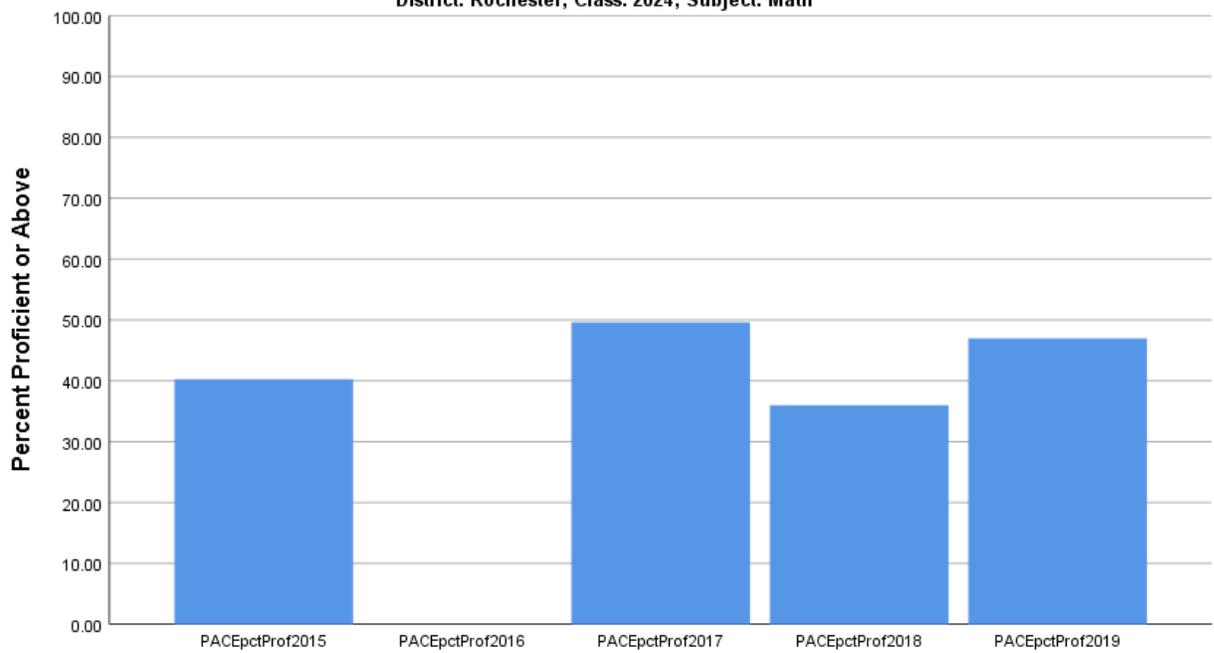
District: Newport, Class: 2026, Subject: ELA



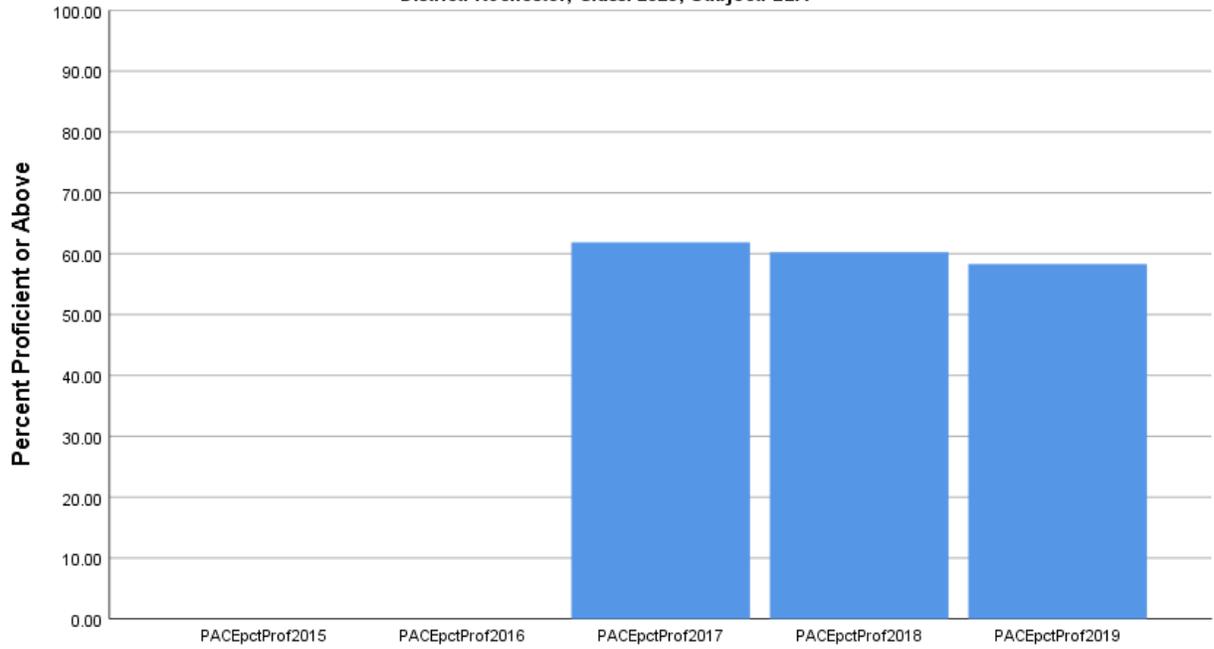
District: Rochester, Class: 2024, Subject: ELA



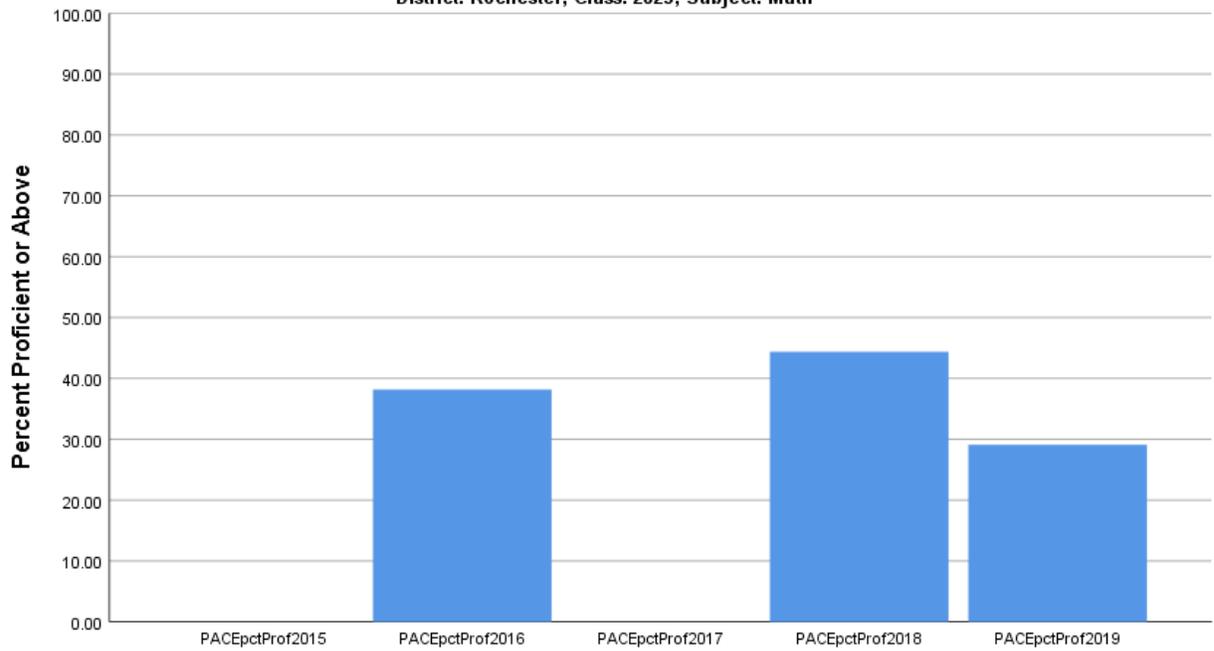
District: Rochester, Class: 2024, Subject: Math



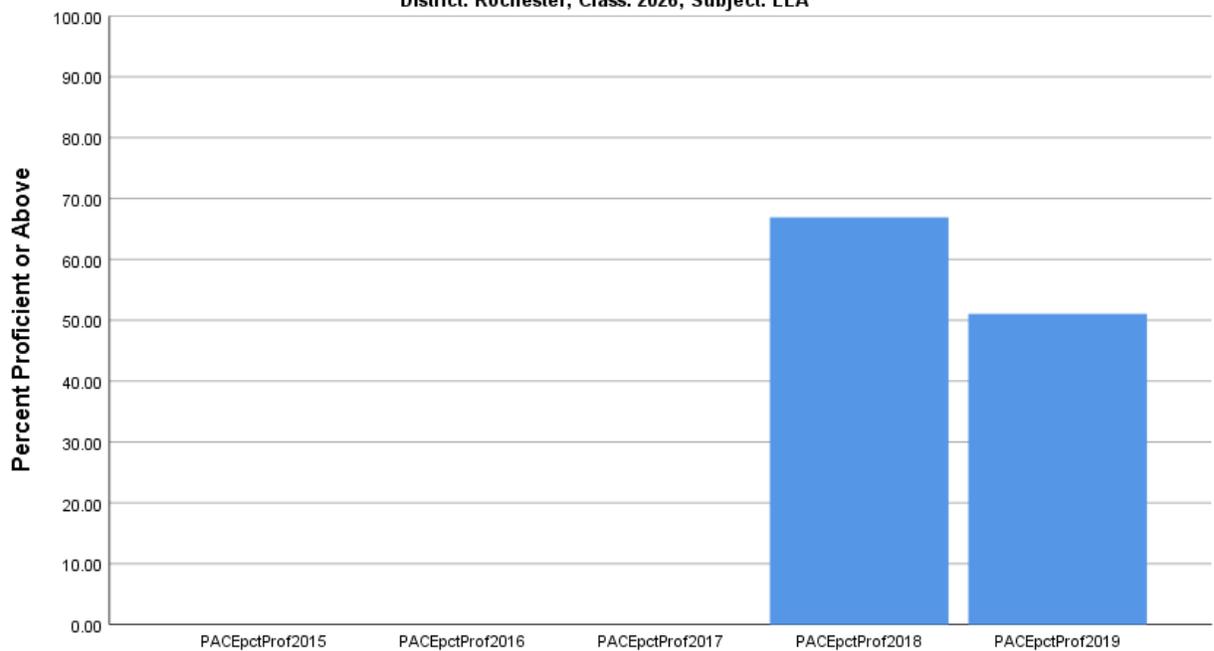
District: Rochester, Class: 2025, Subject: ELA



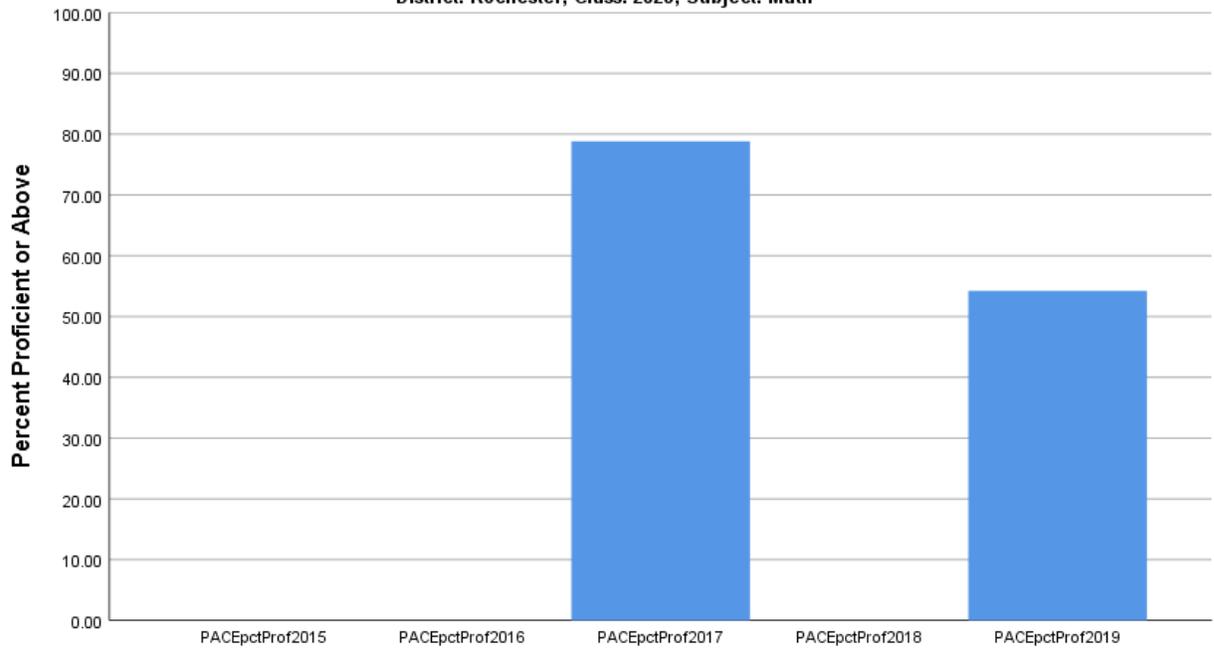
District: Rochester, Class: 2025, Subject: Math



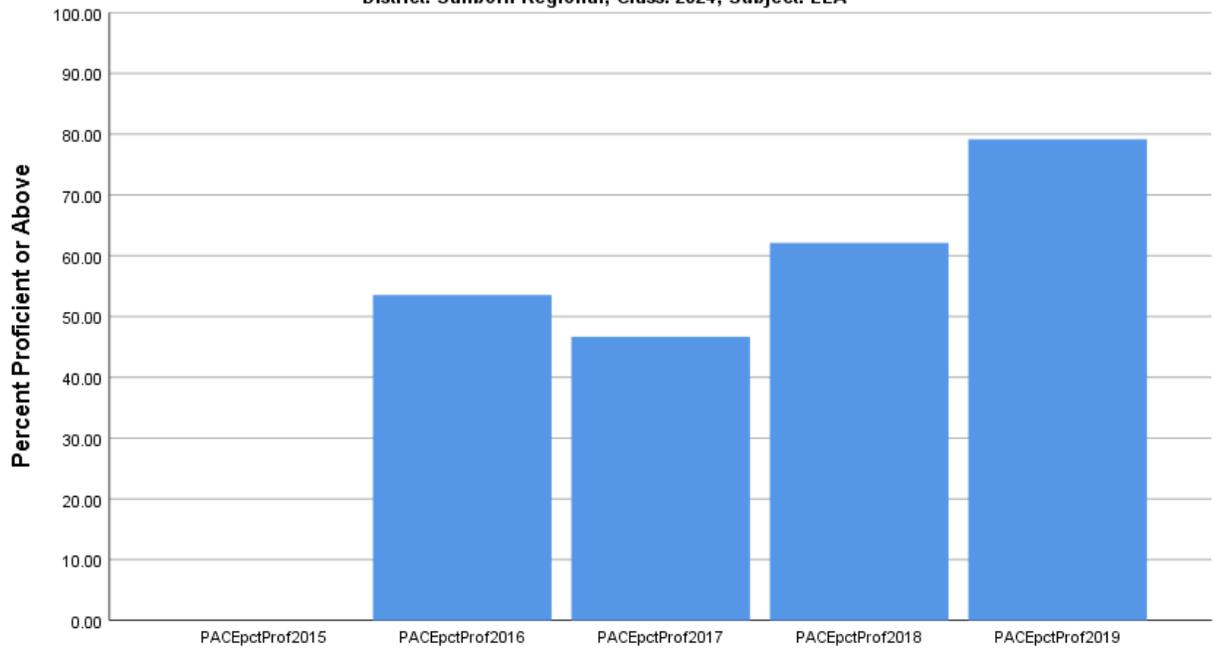
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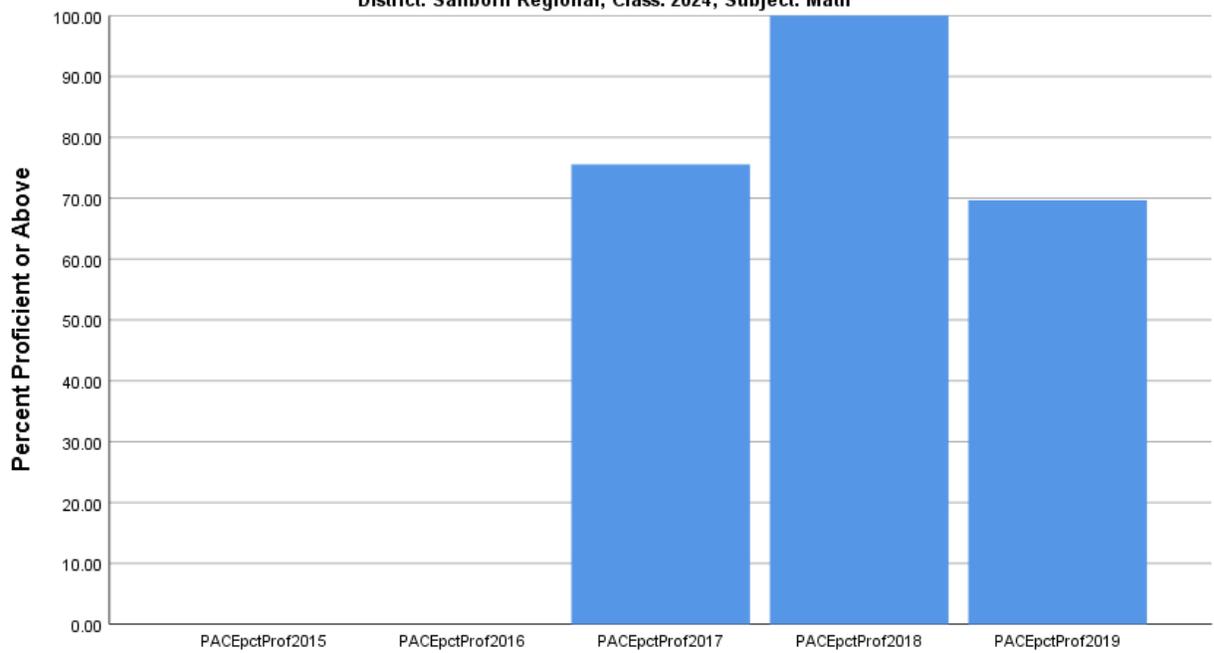
District: Rochester, Class: 2026, Subject: Math



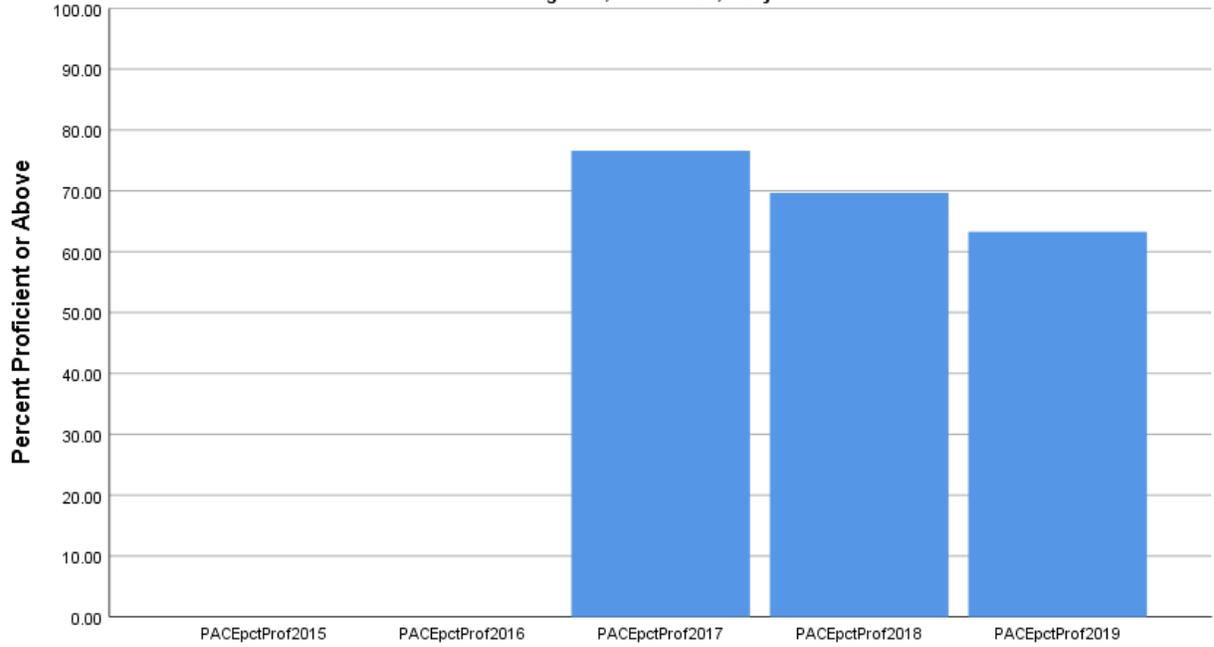
District: Sanborn Regional, Class: 2024, Subject: ELA



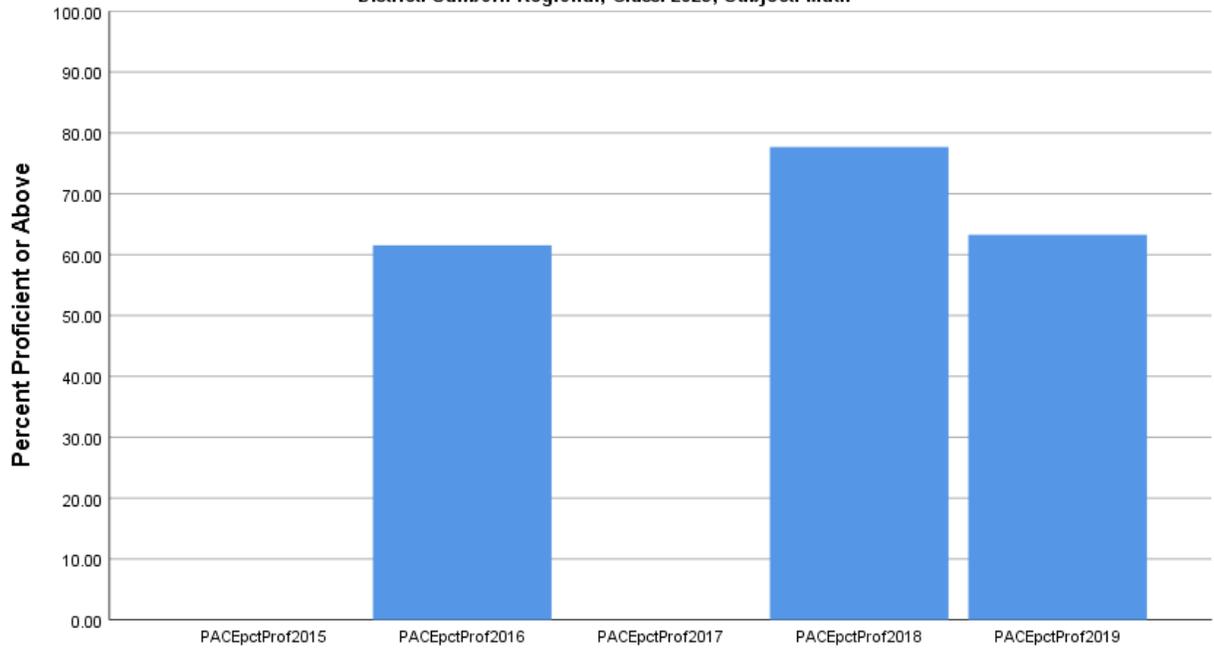
District: Sanborn Regional, Class: 2024, Subject: Math



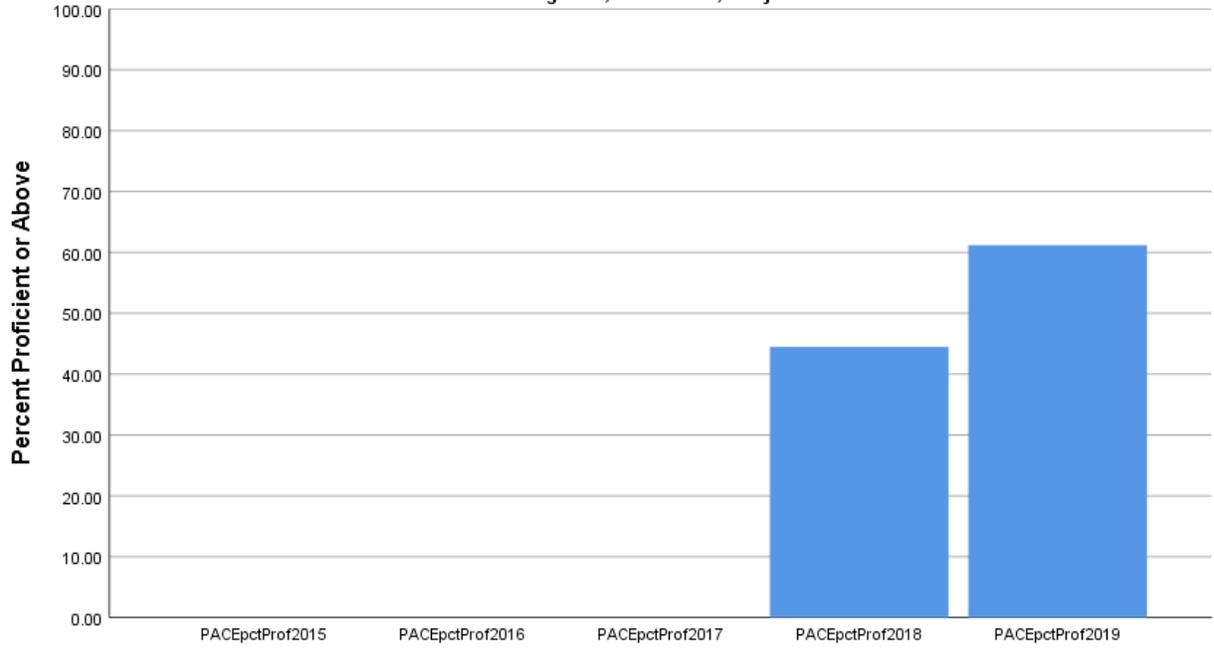
District: Sanborn Regional, Class: 2025, Subject: ELA

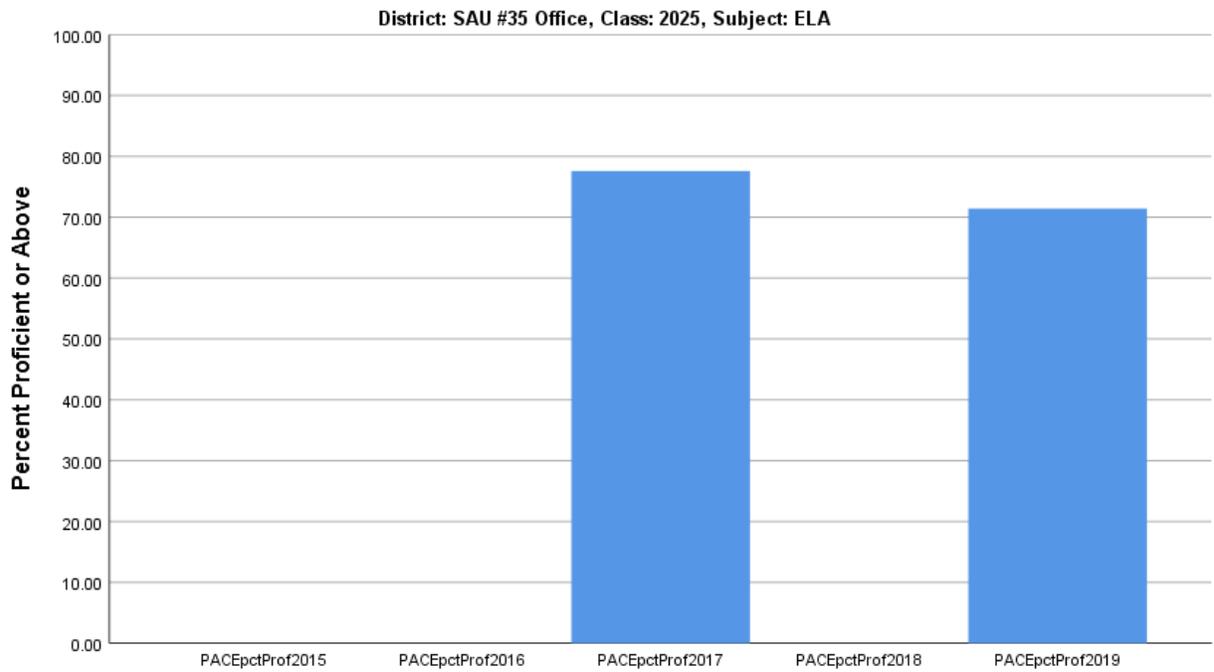
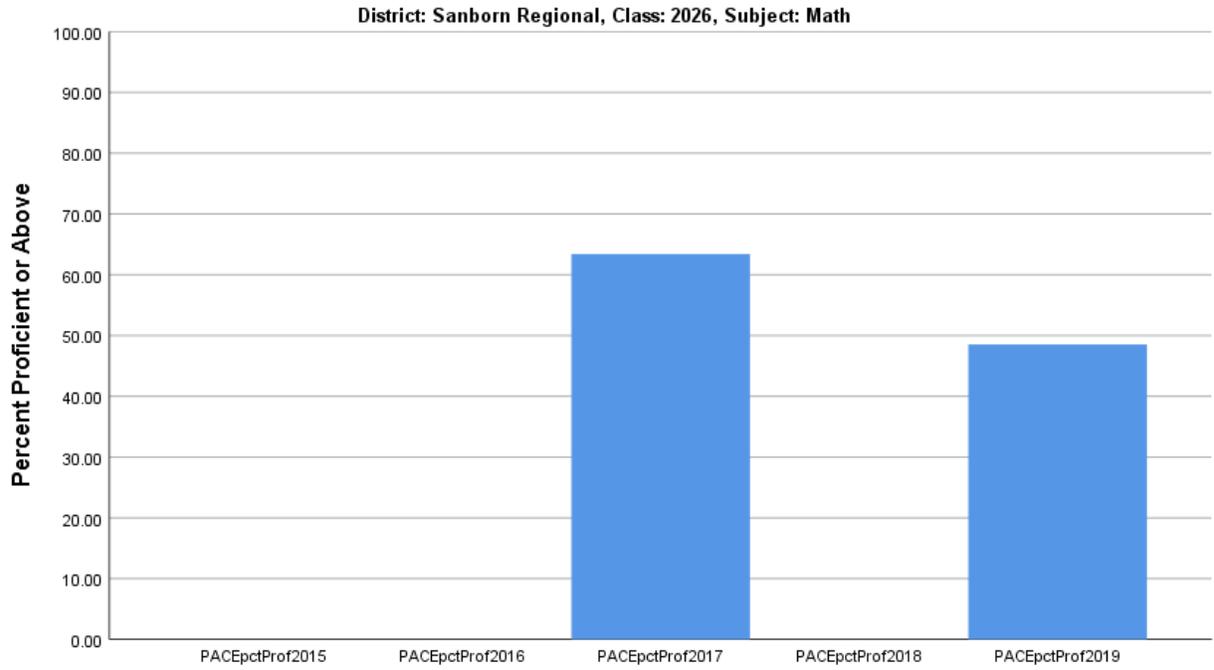


District: Sanborn Regional, Class: 2025, Subject: Math

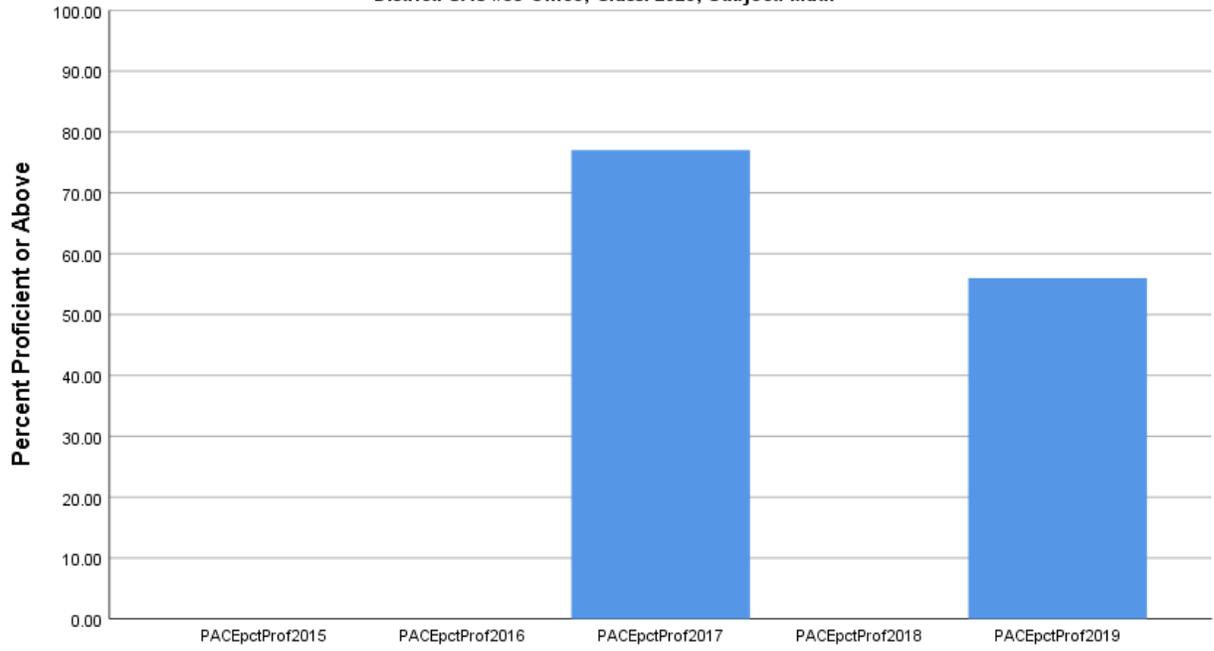


District: Sanborn Regional, Class: 2026, Subject: ELA

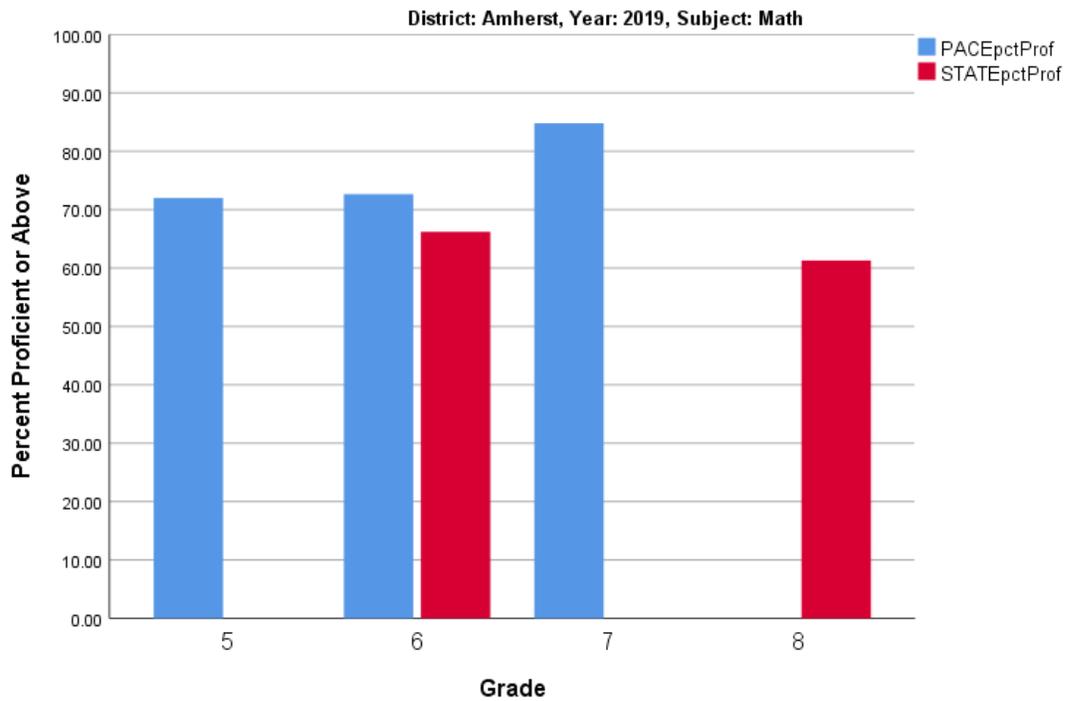
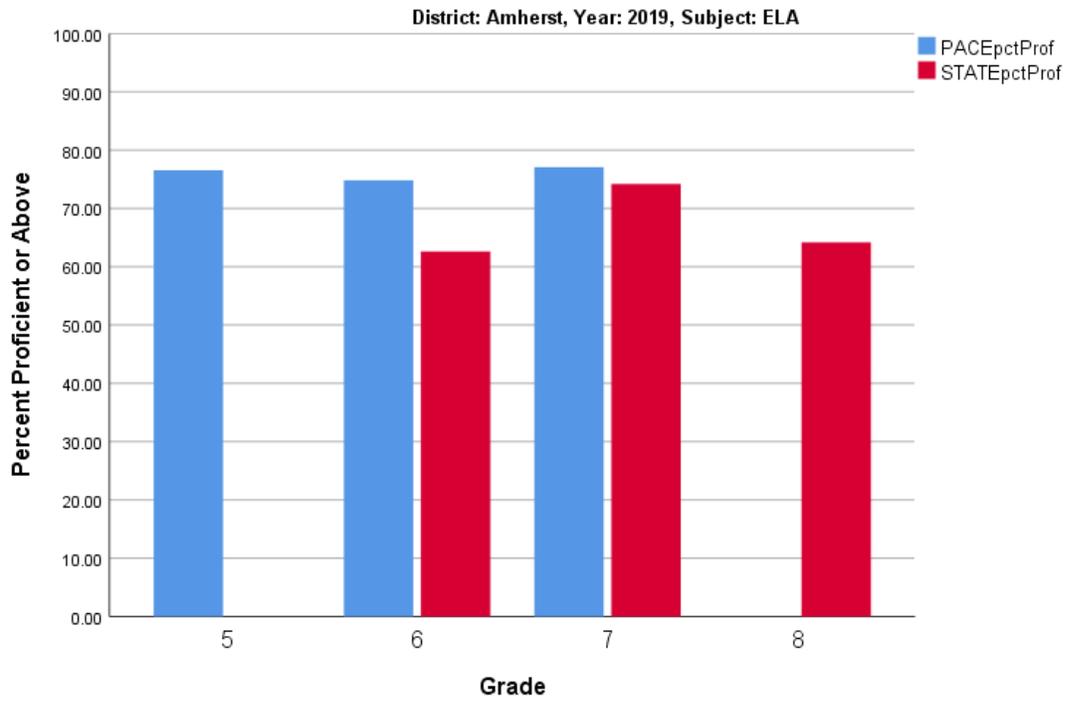


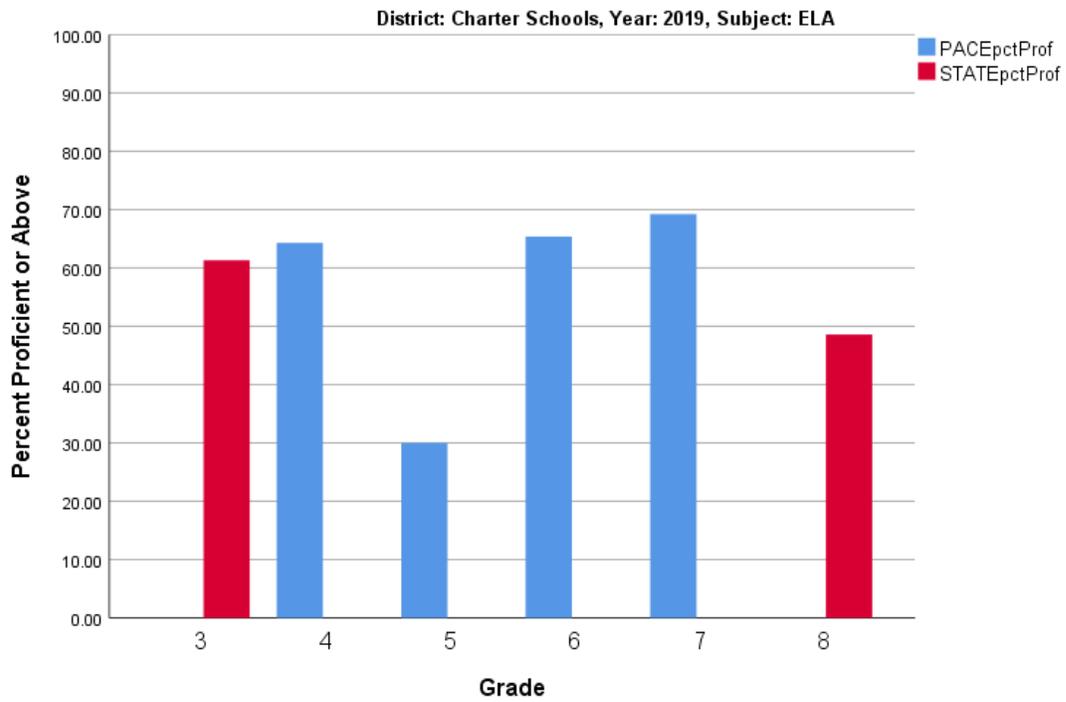
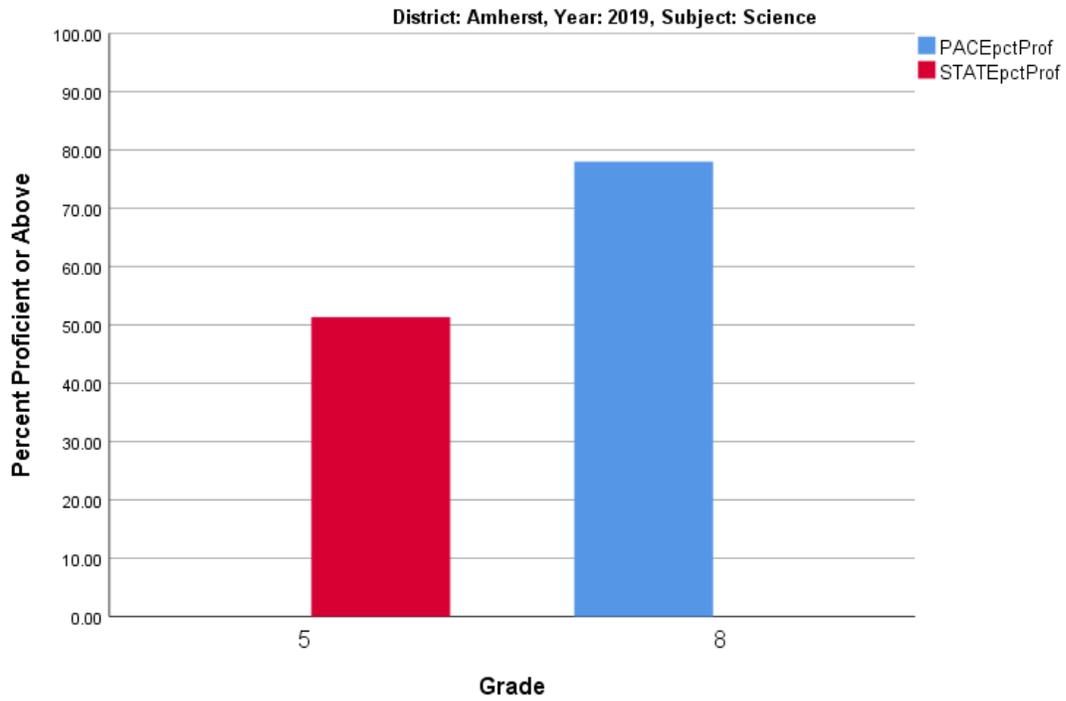


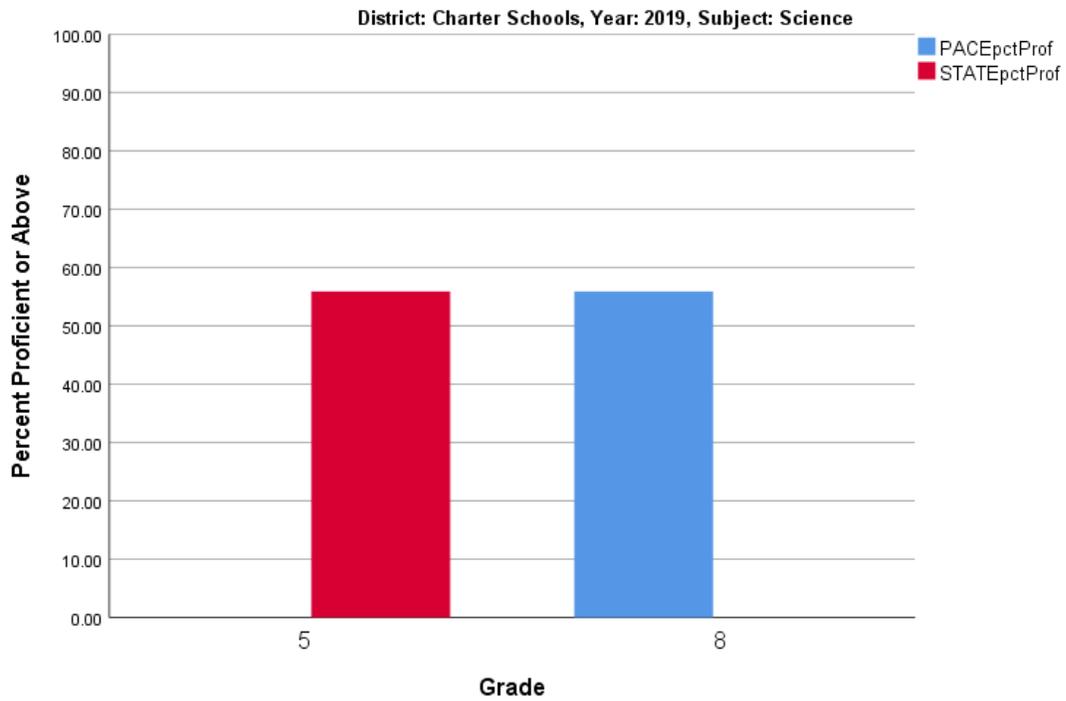
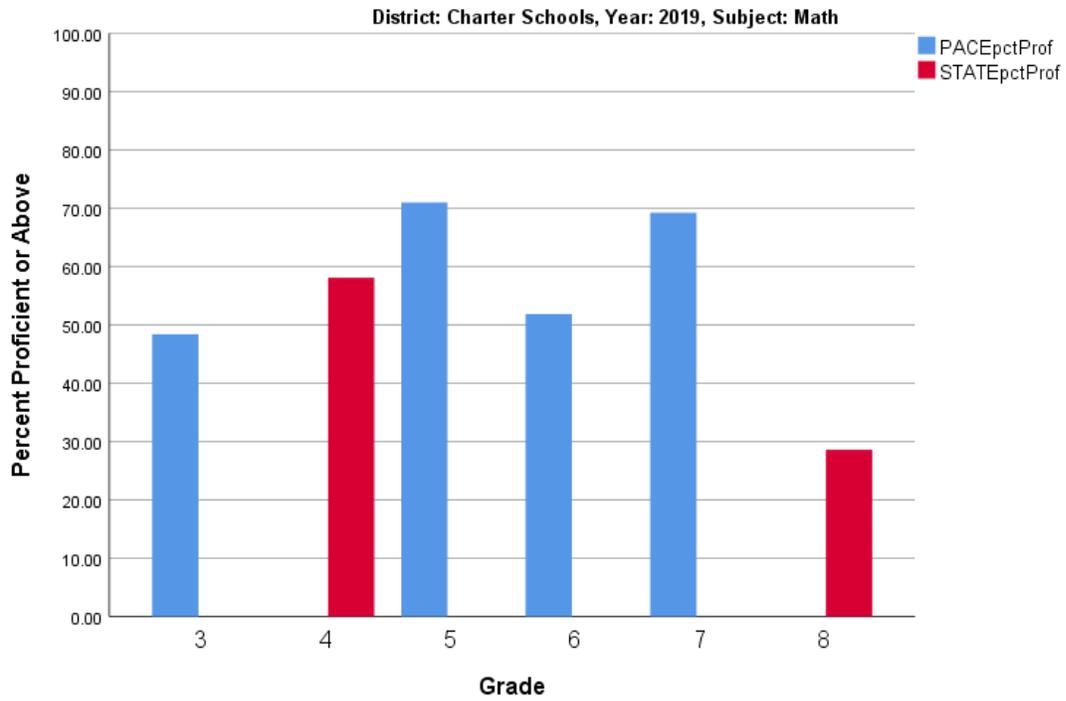
District: SAU #35 Office, Class: 2026, Subject: Math

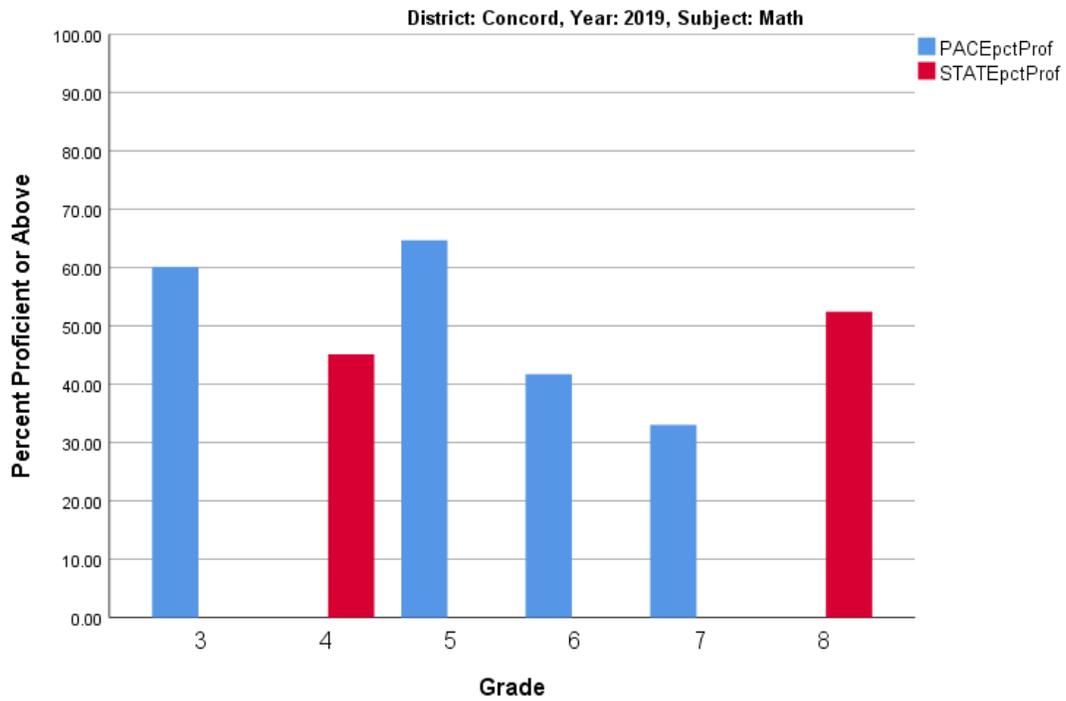
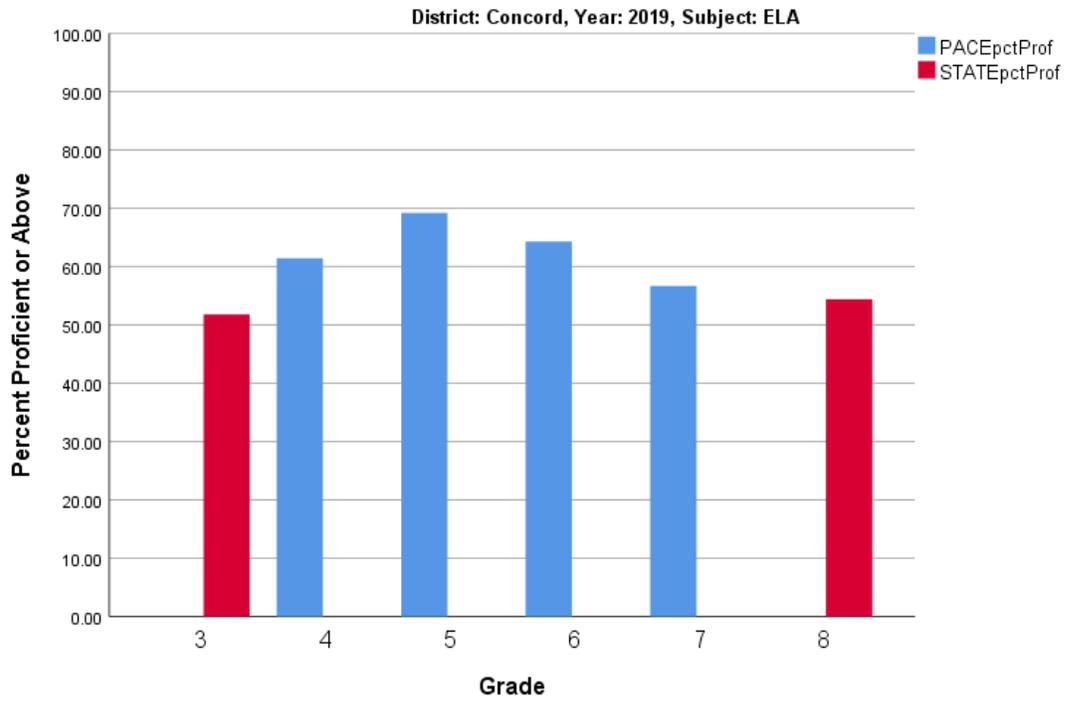


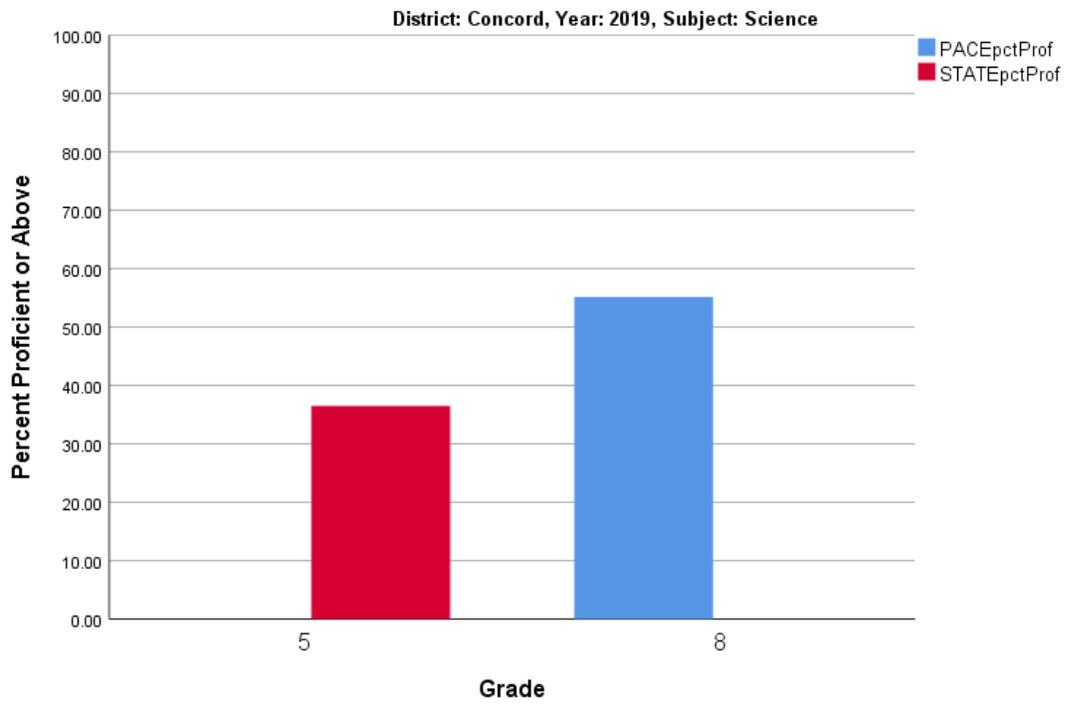
State Test Analysis by District

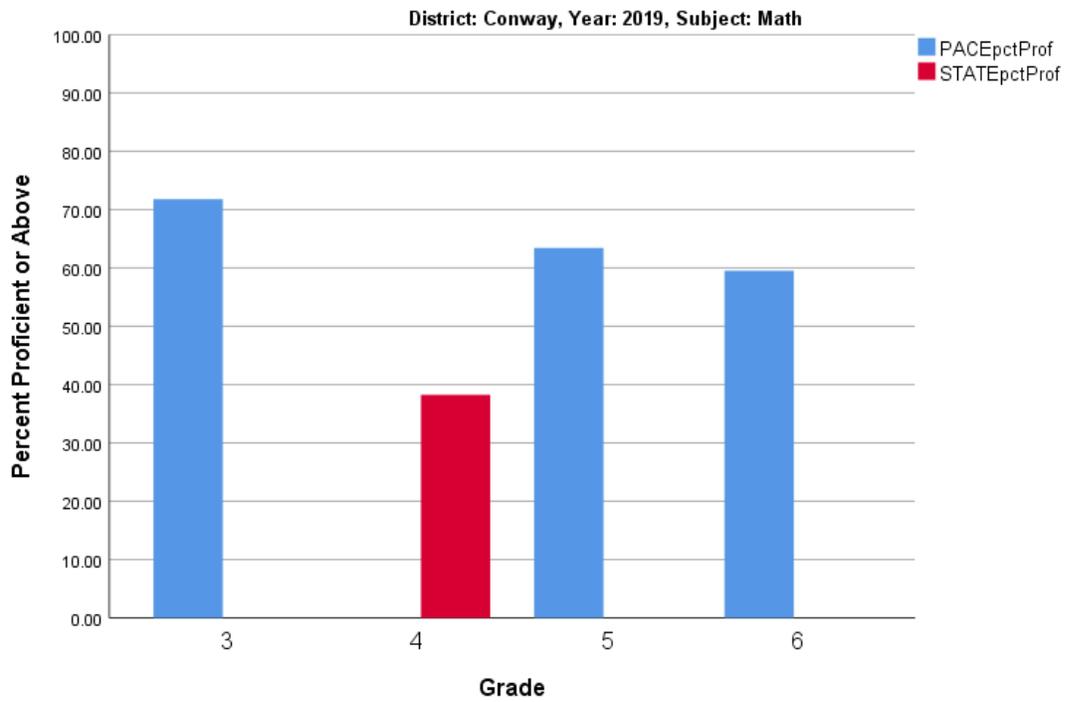
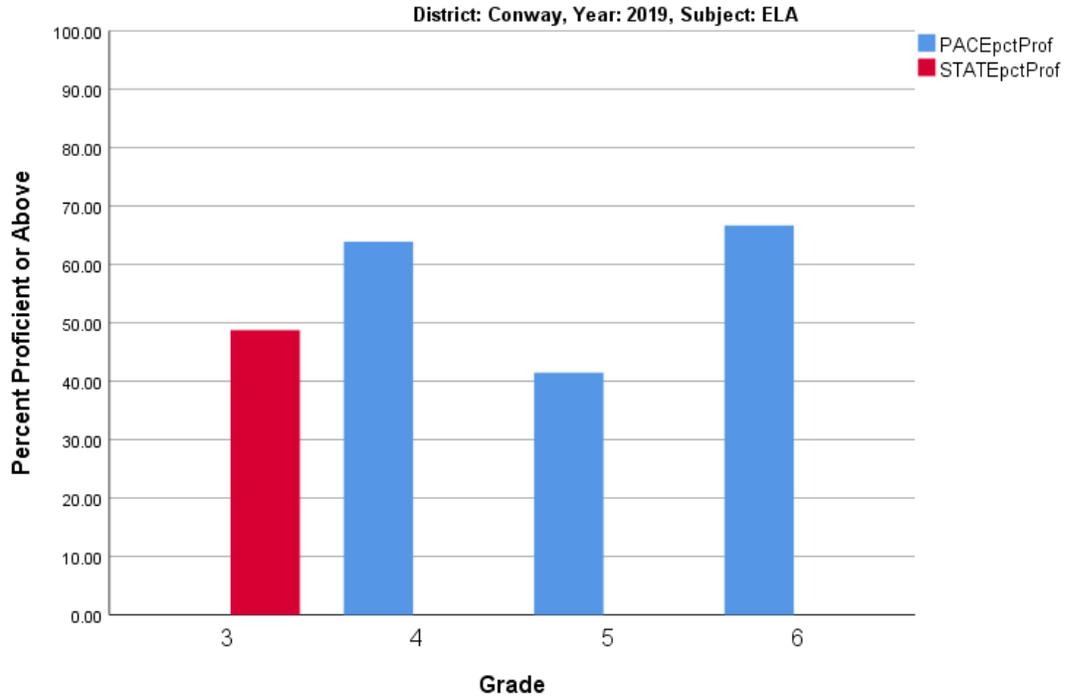


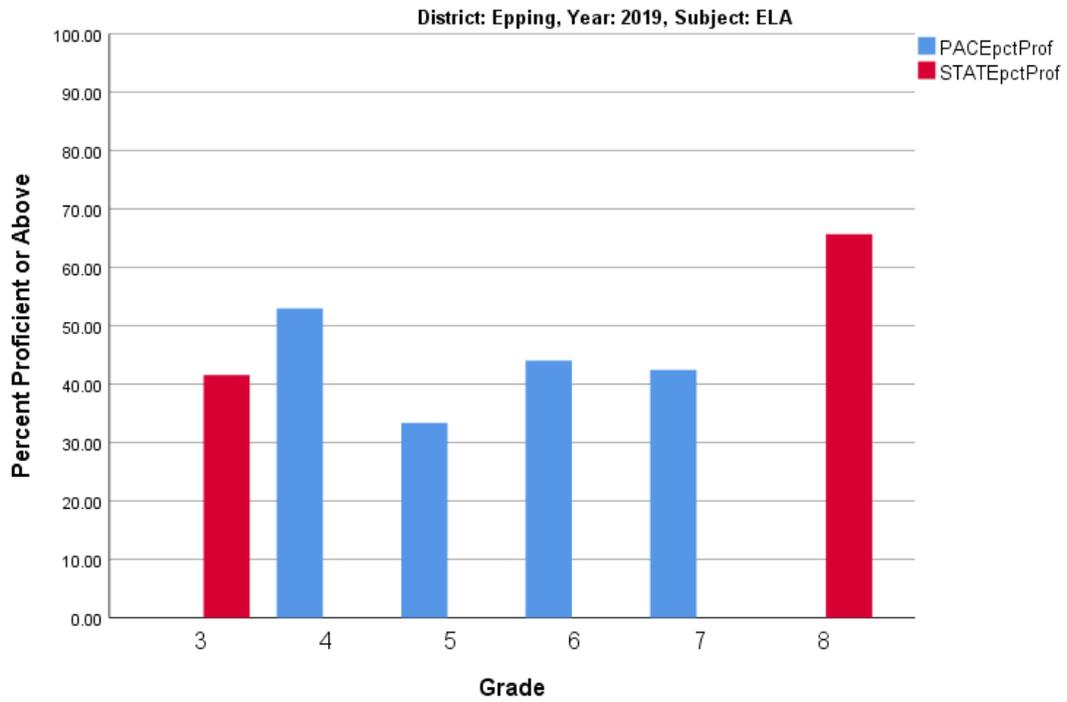


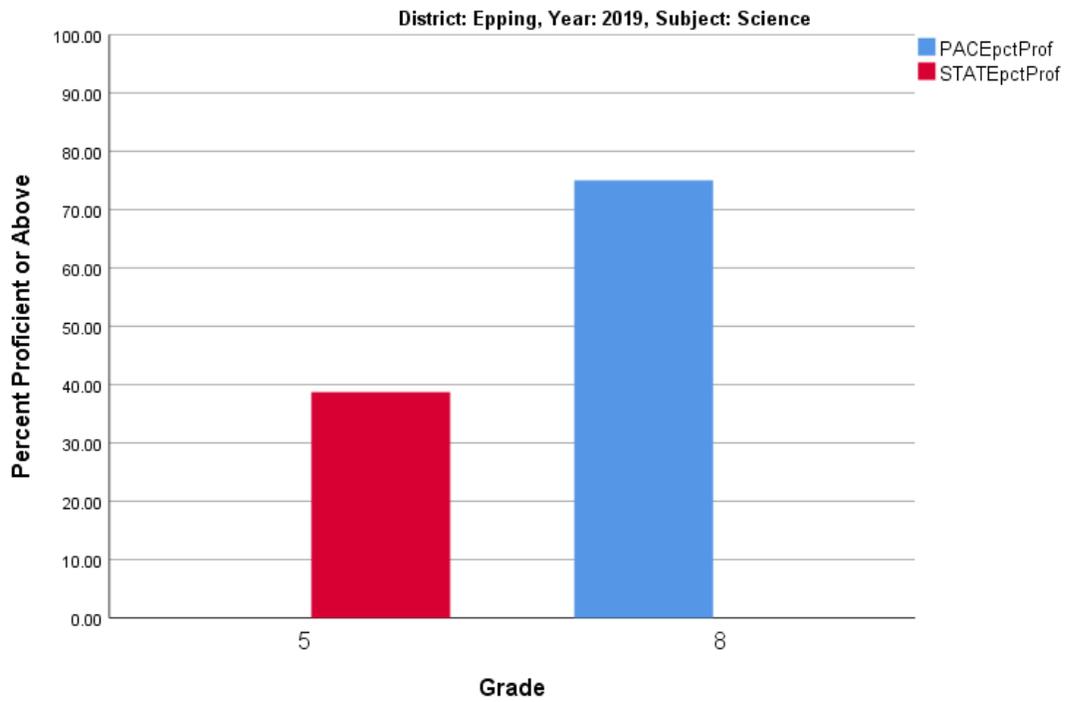
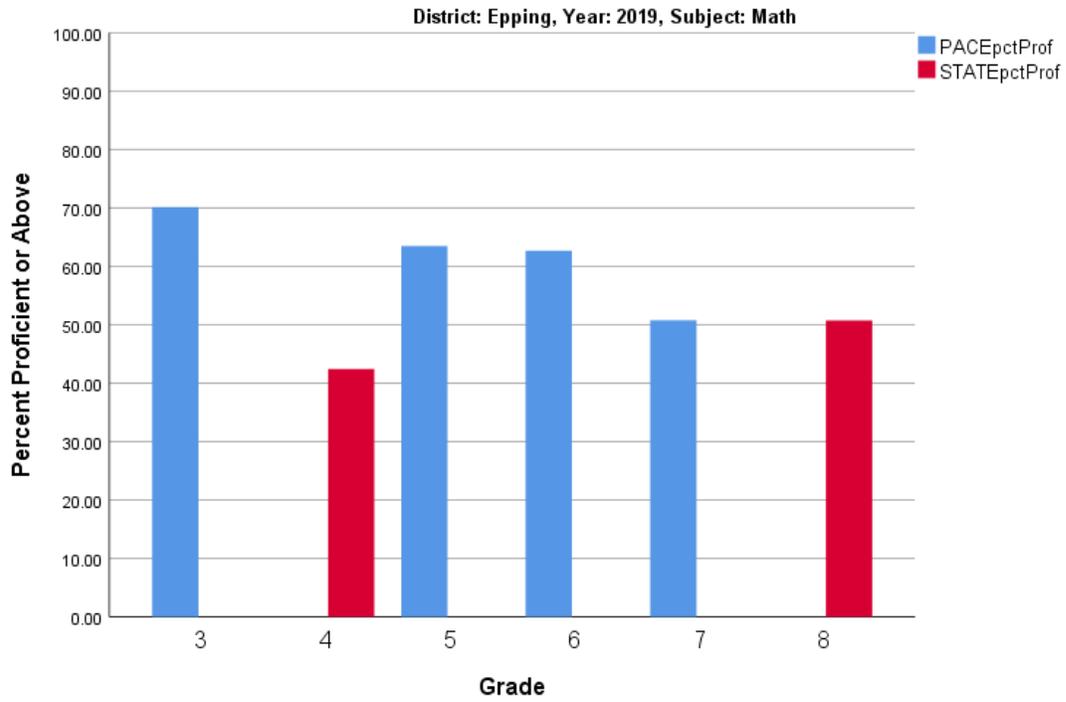


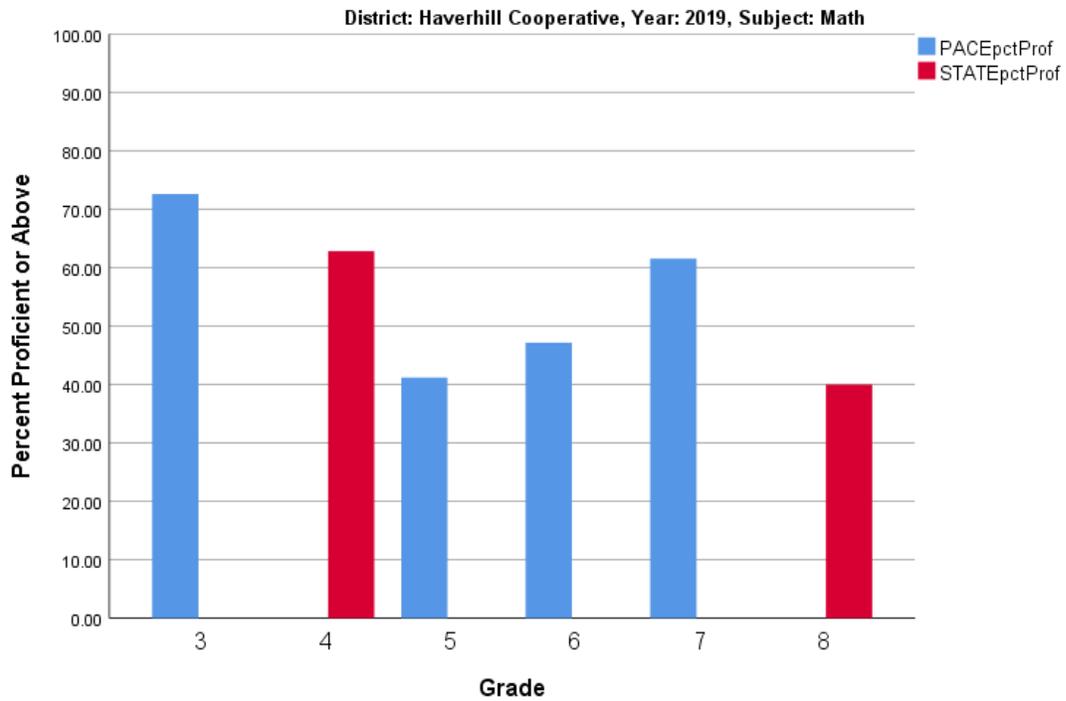
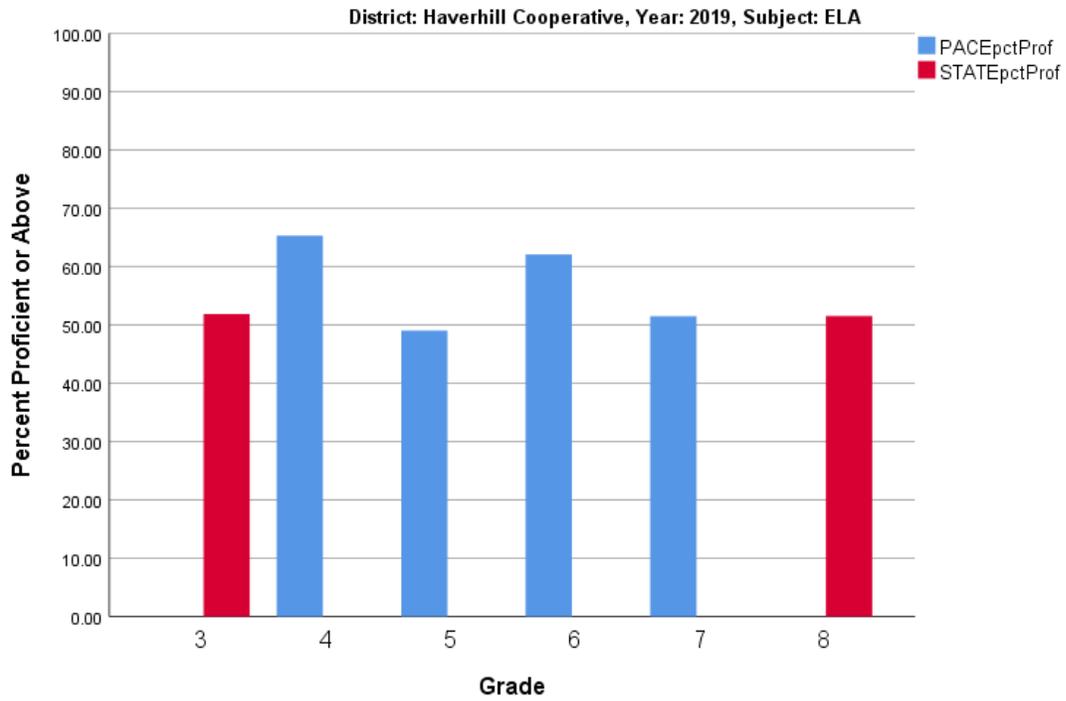


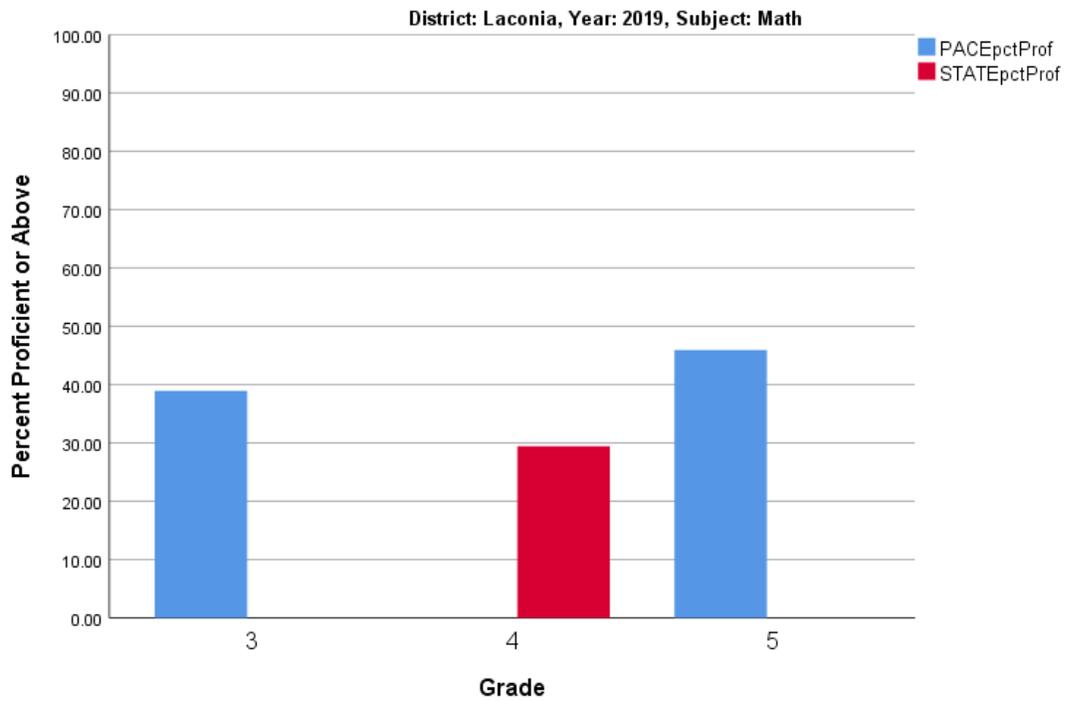
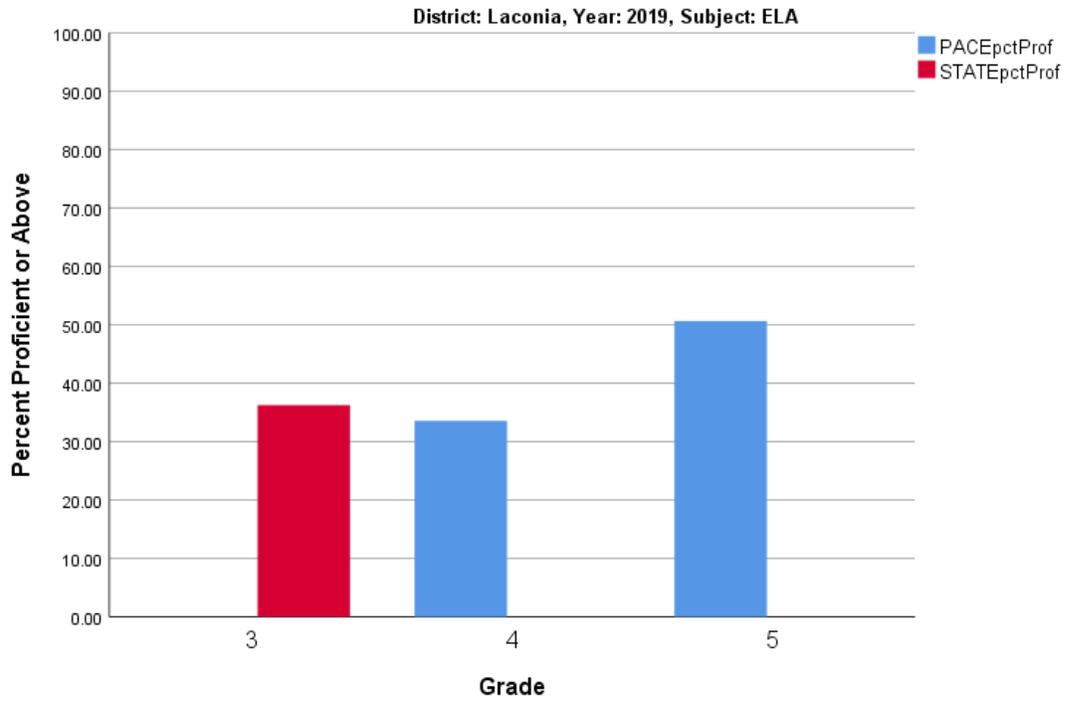


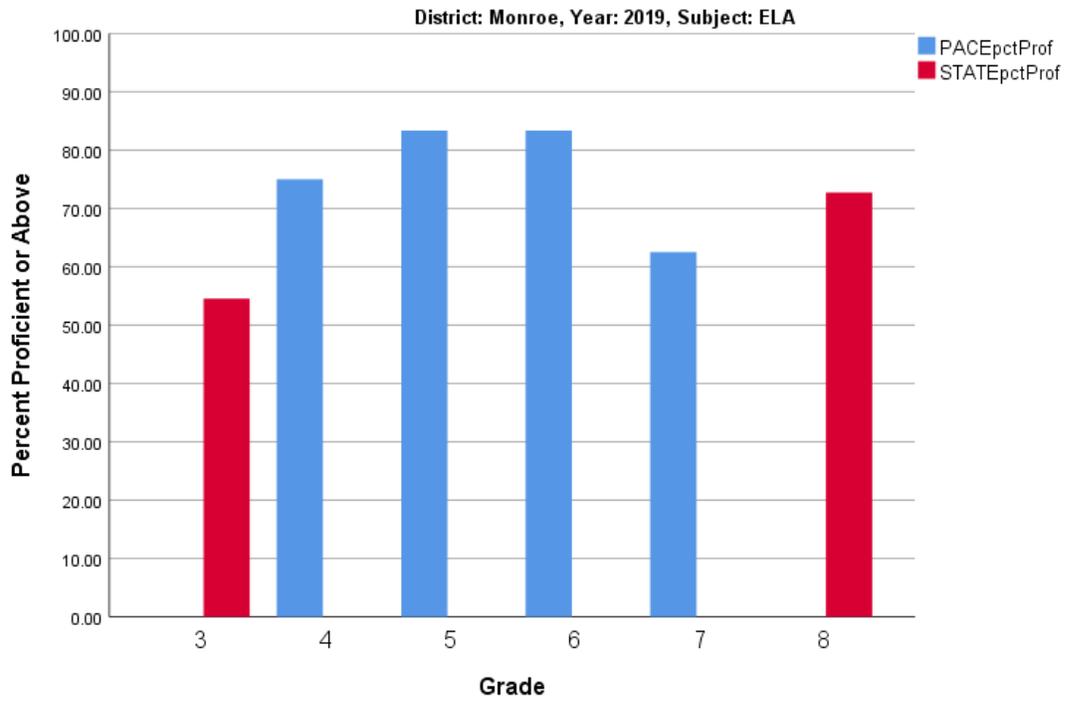


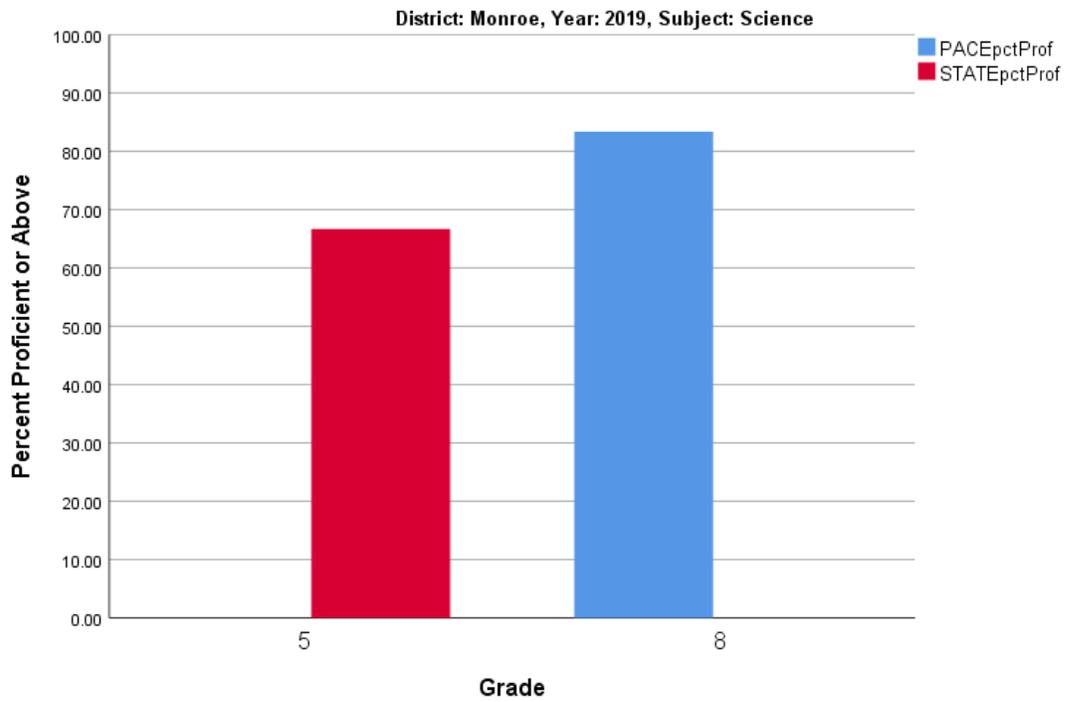
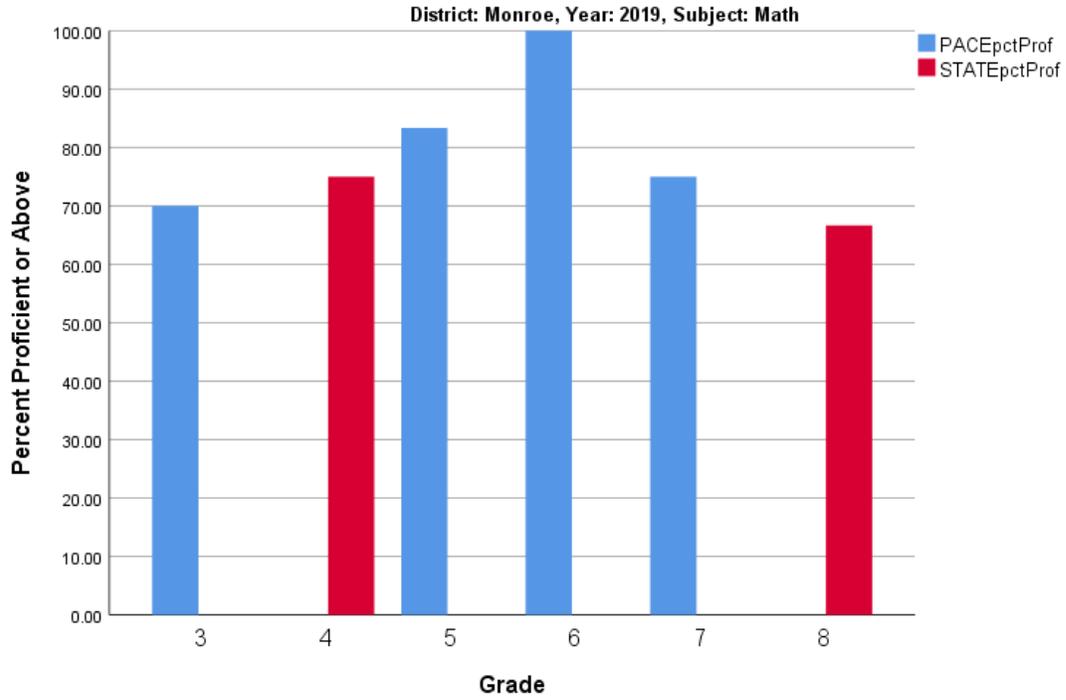


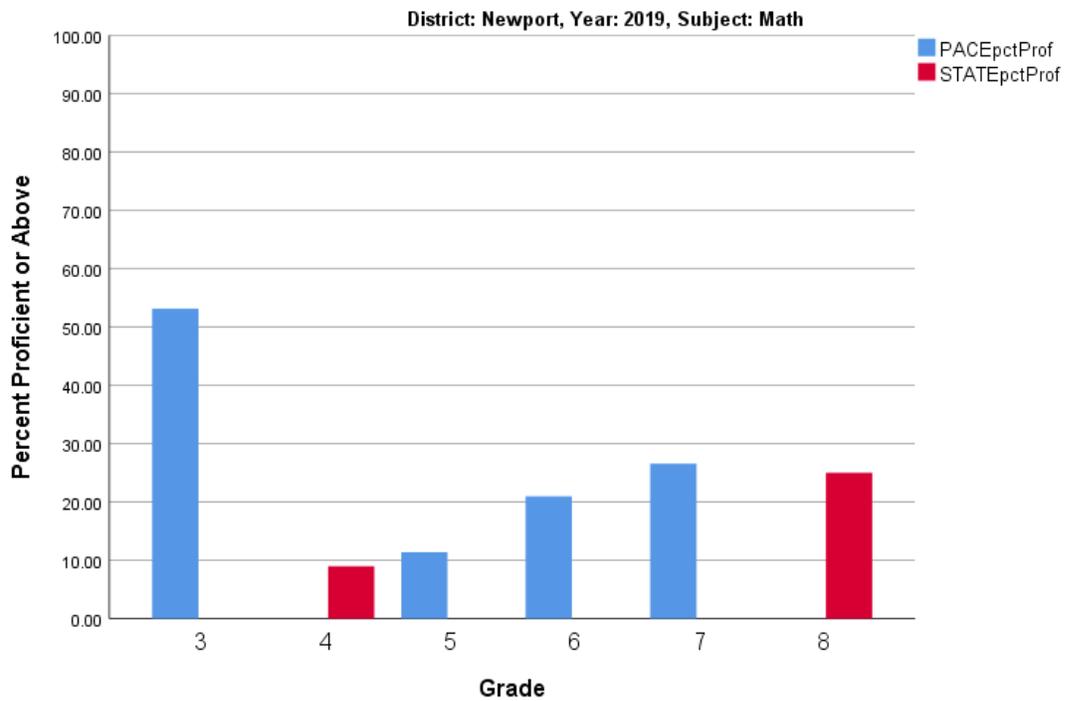
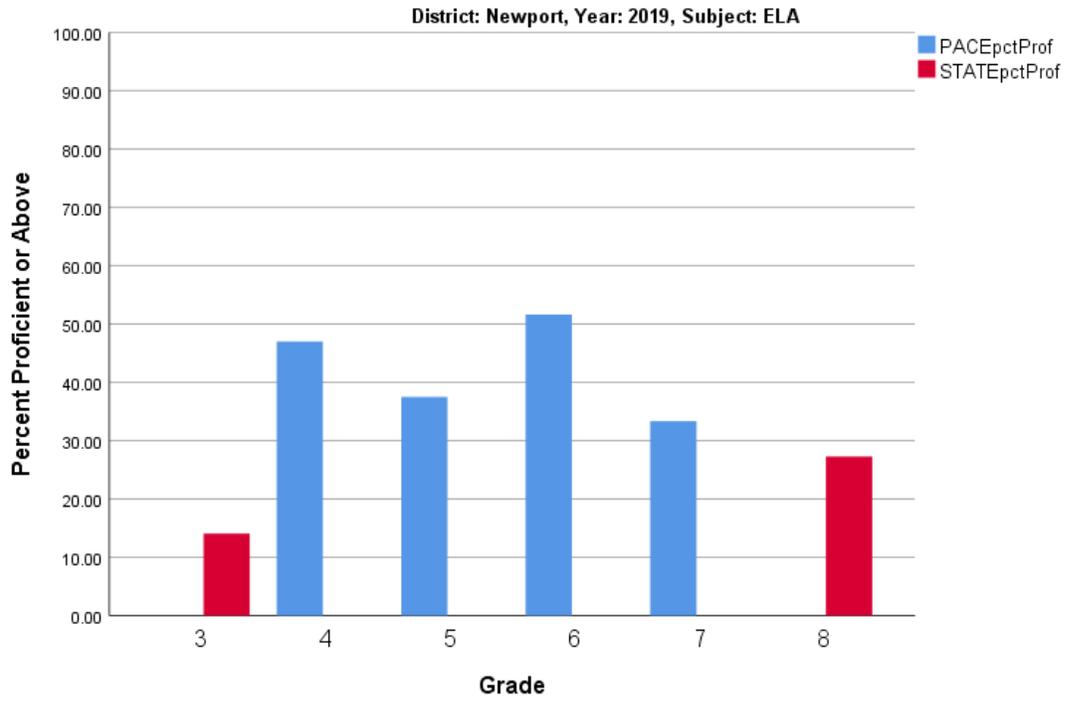


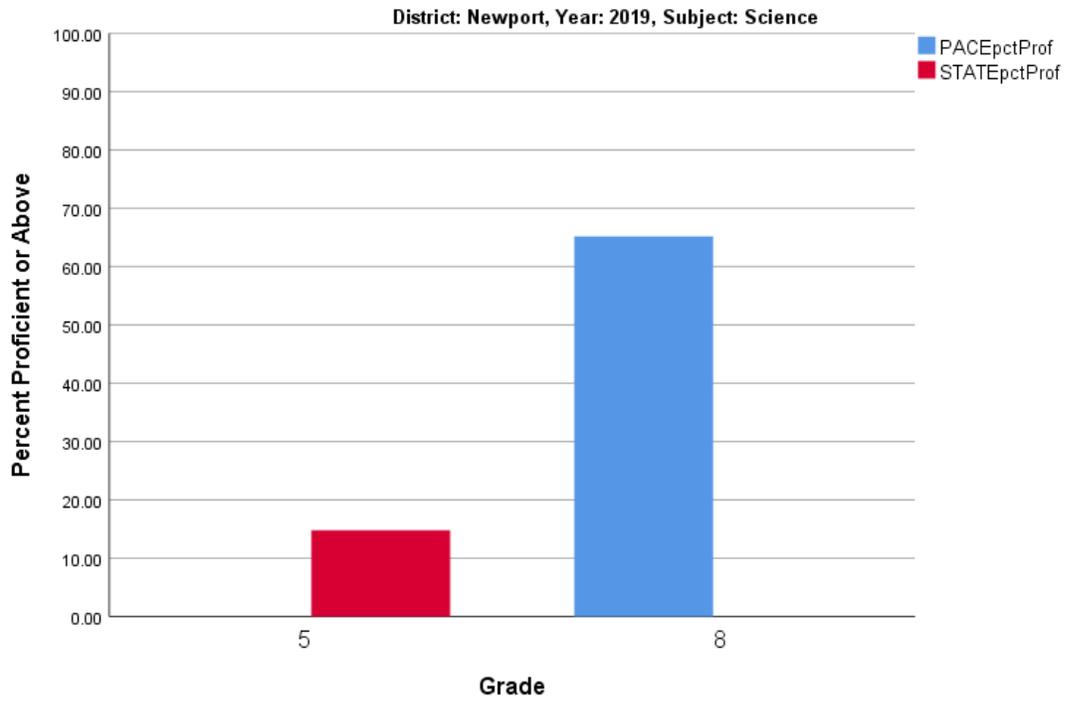


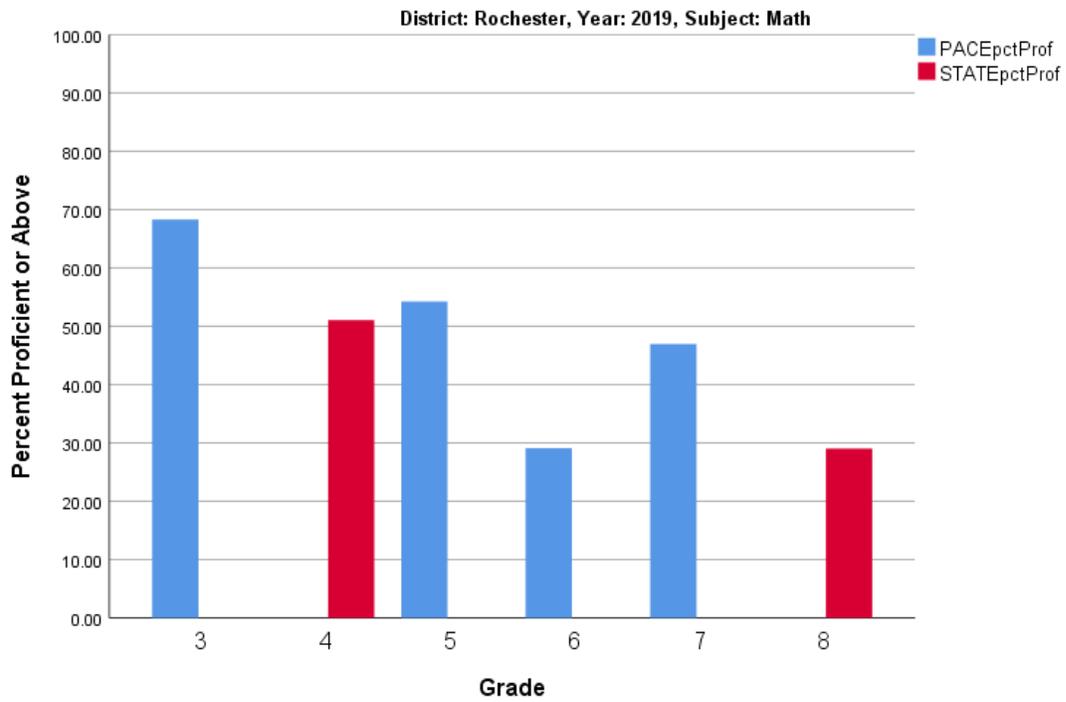
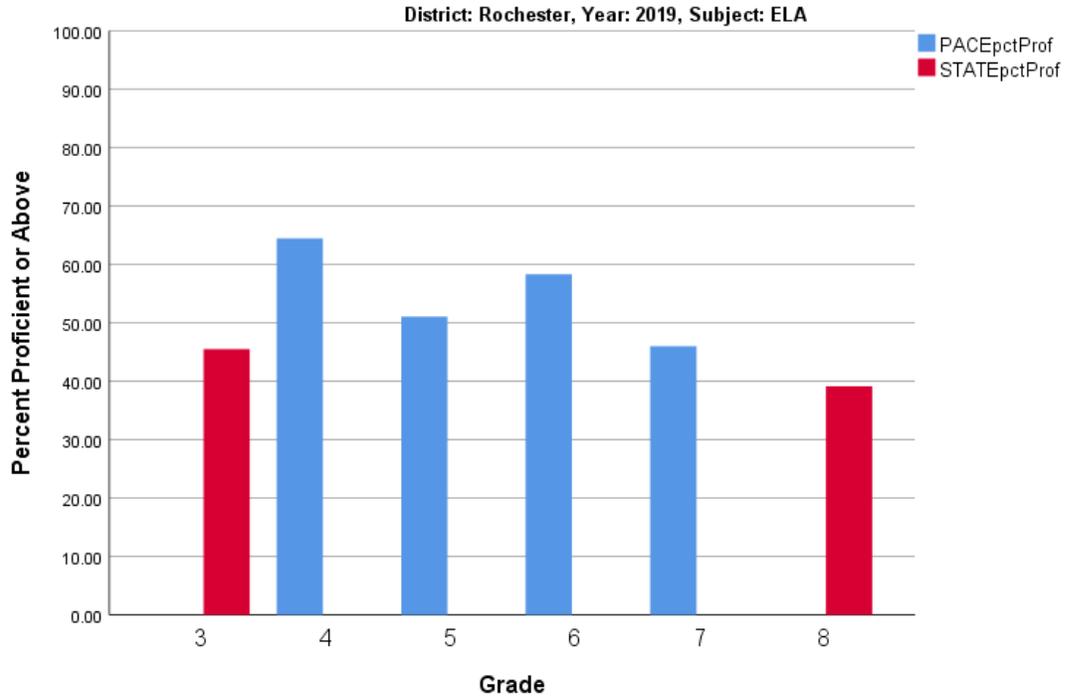


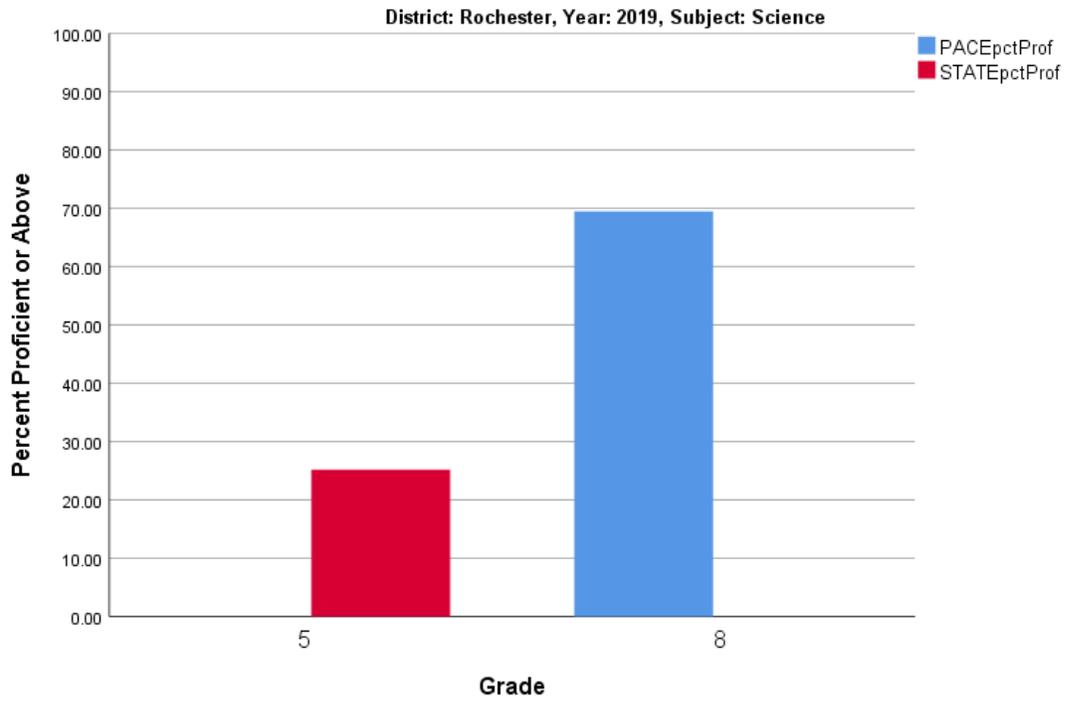


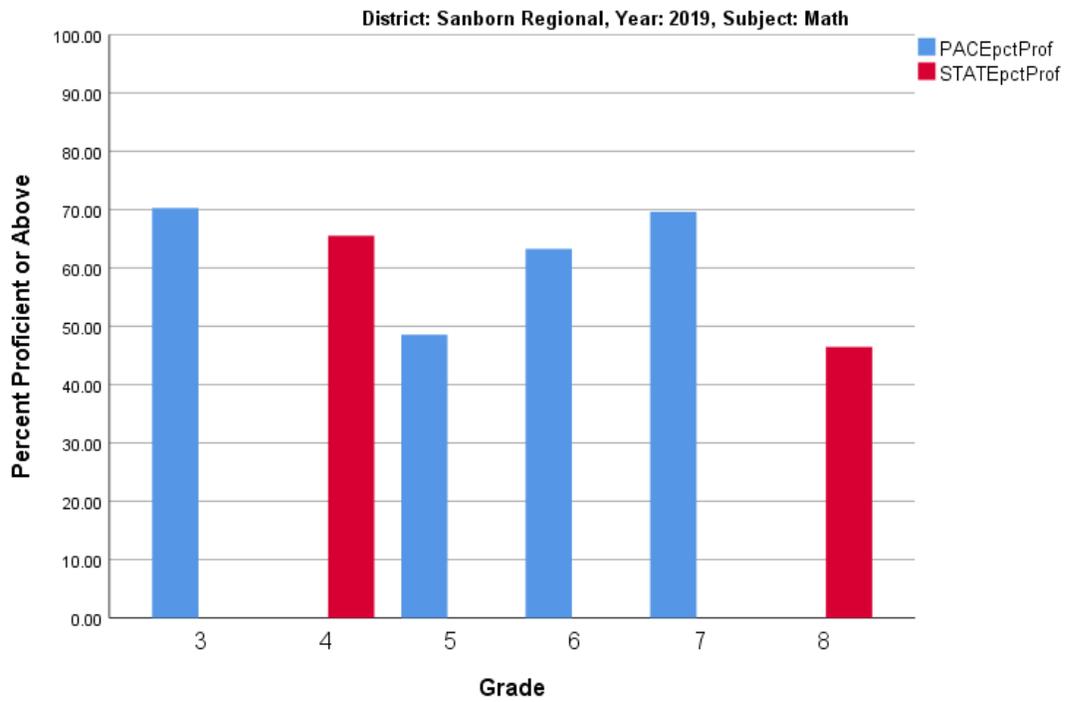
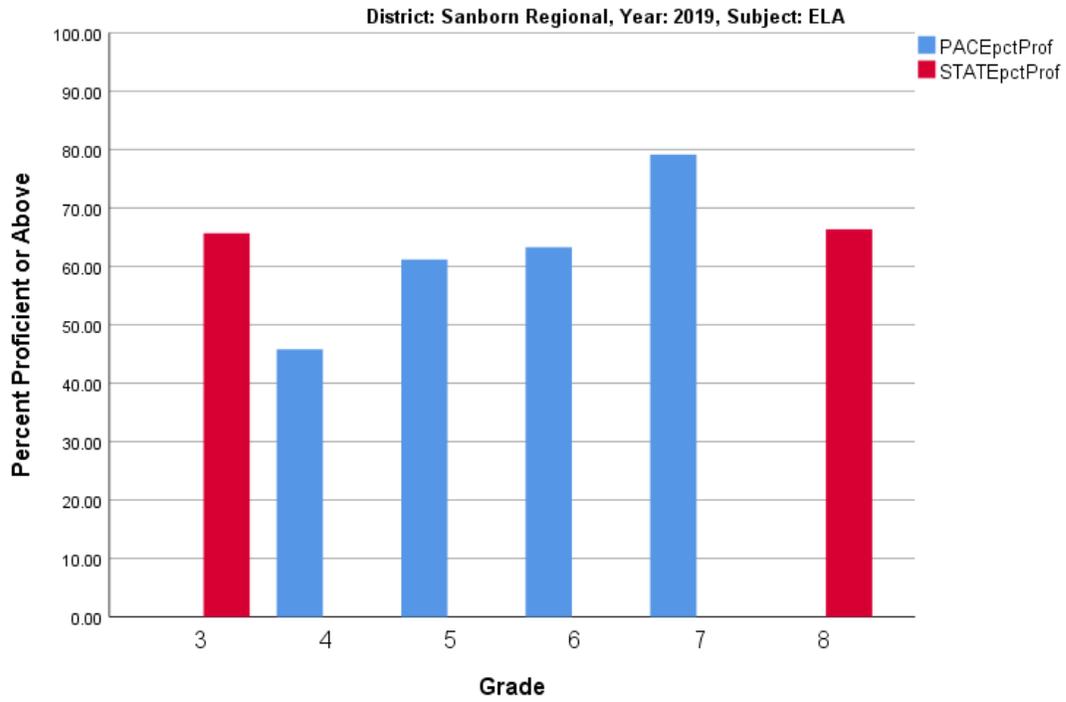


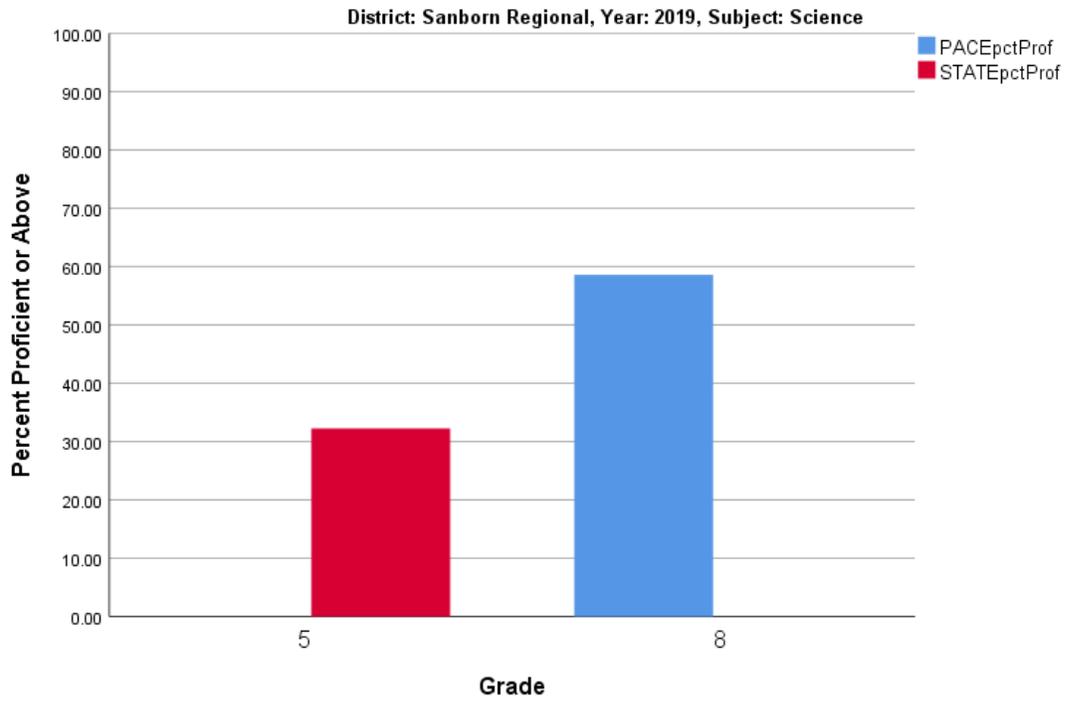


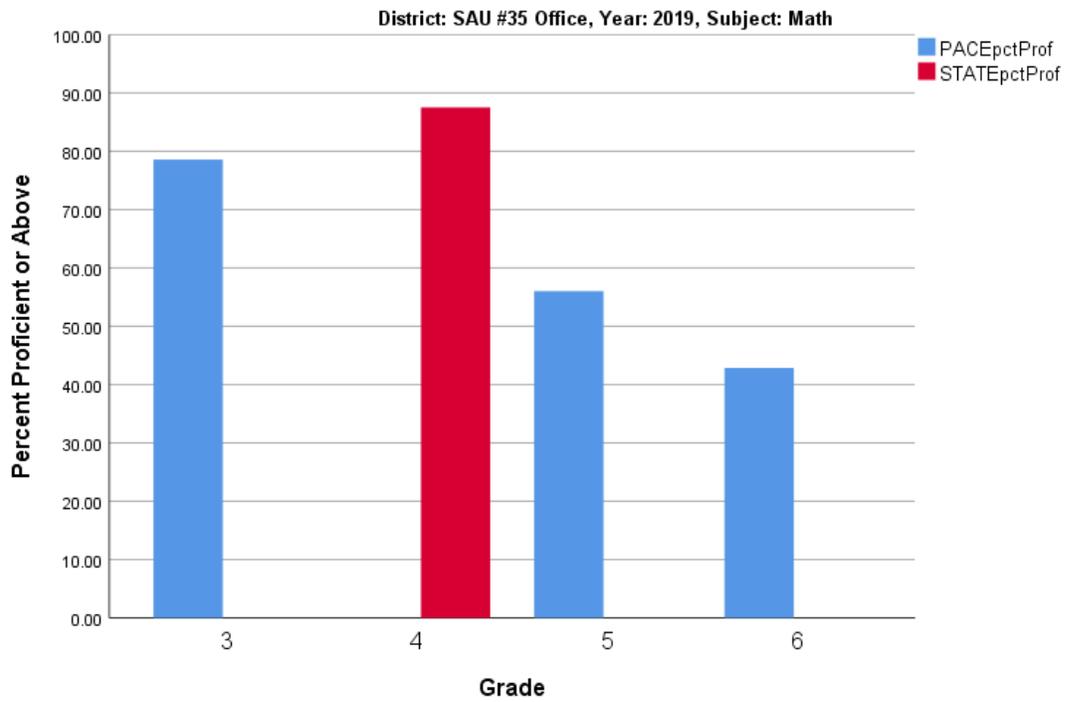
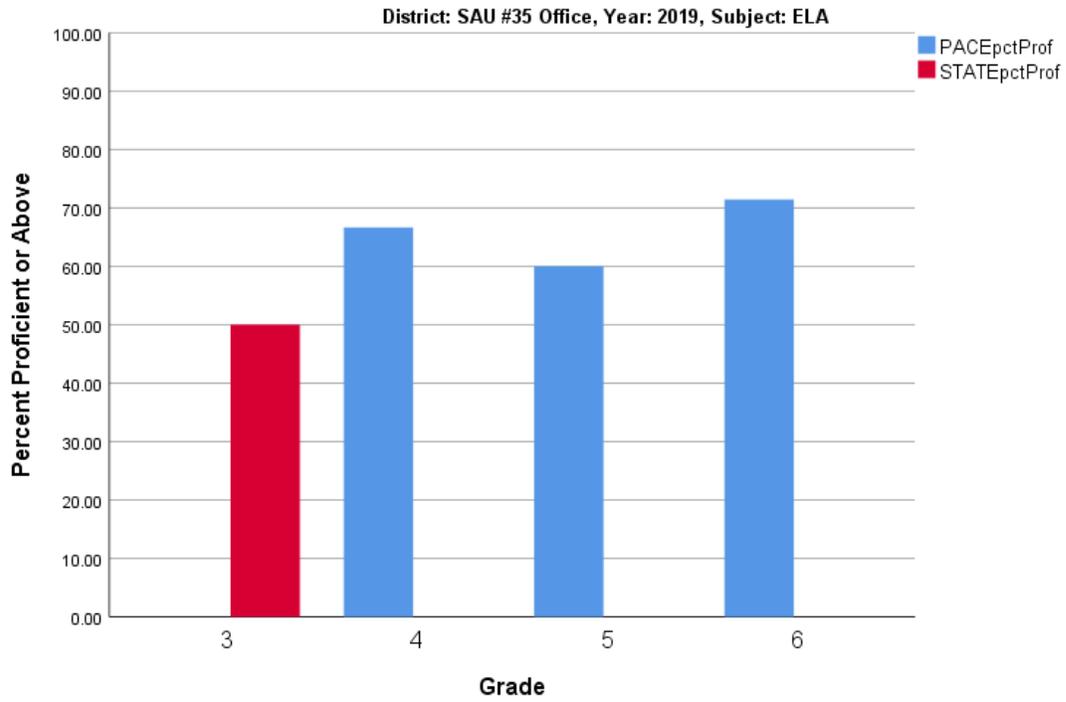




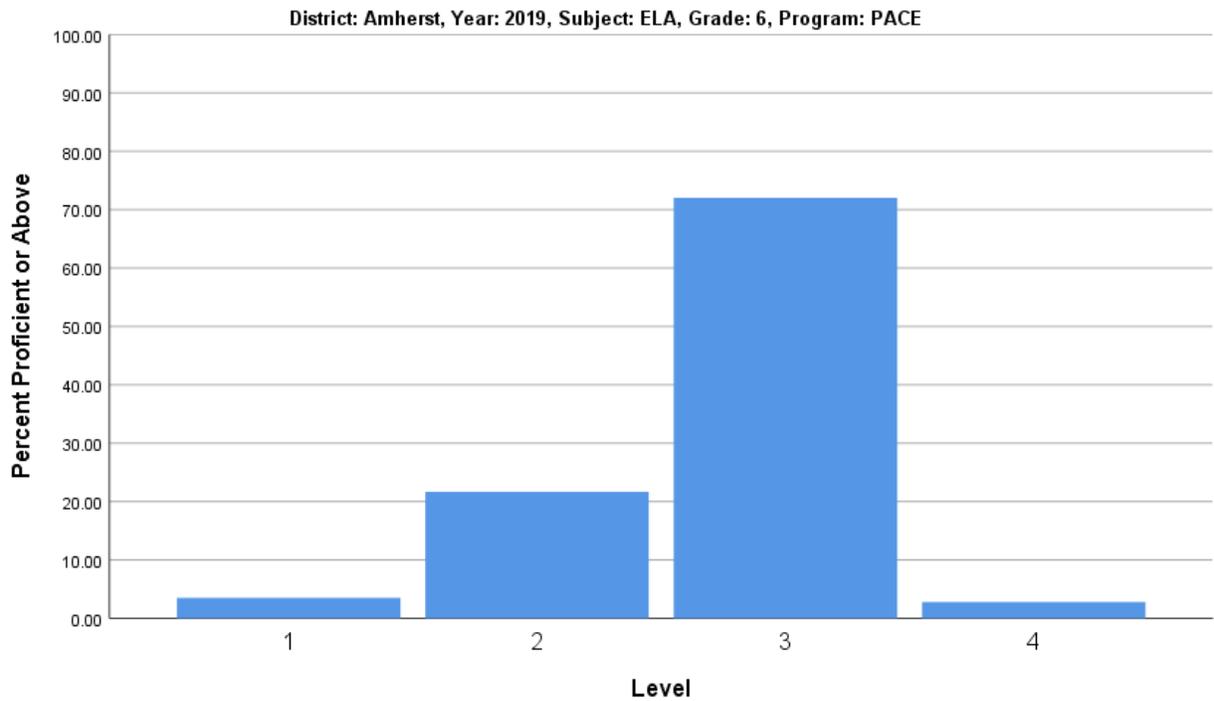
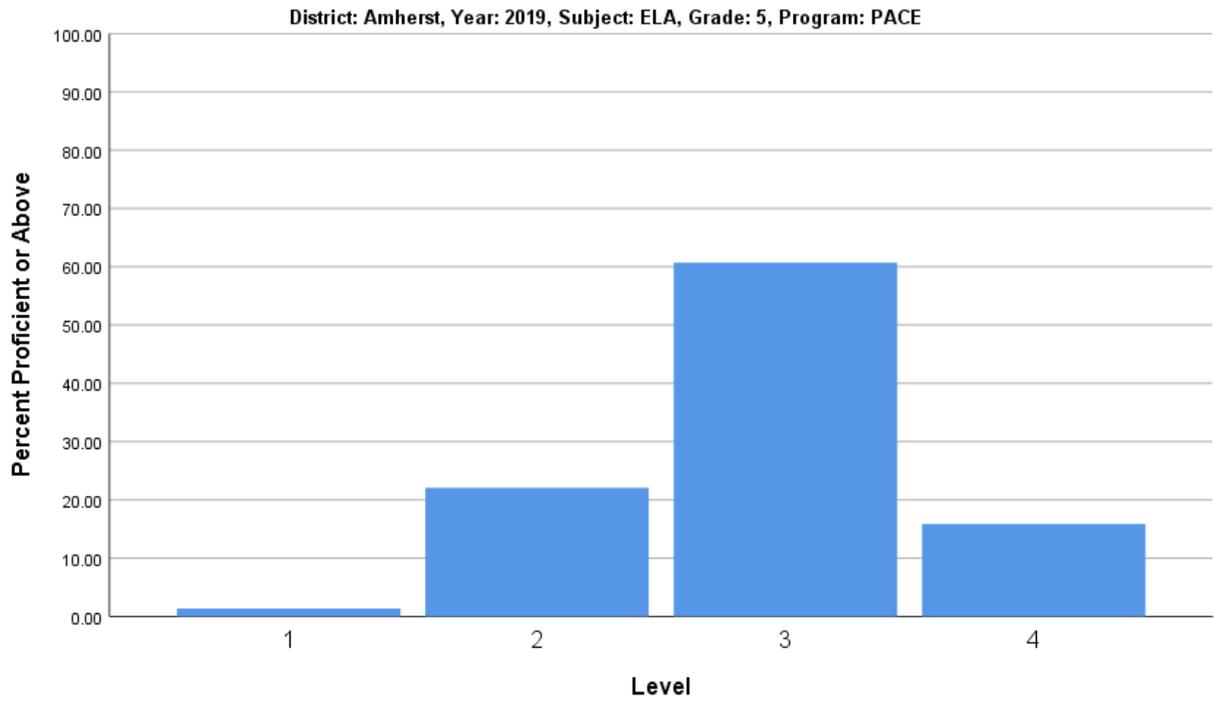


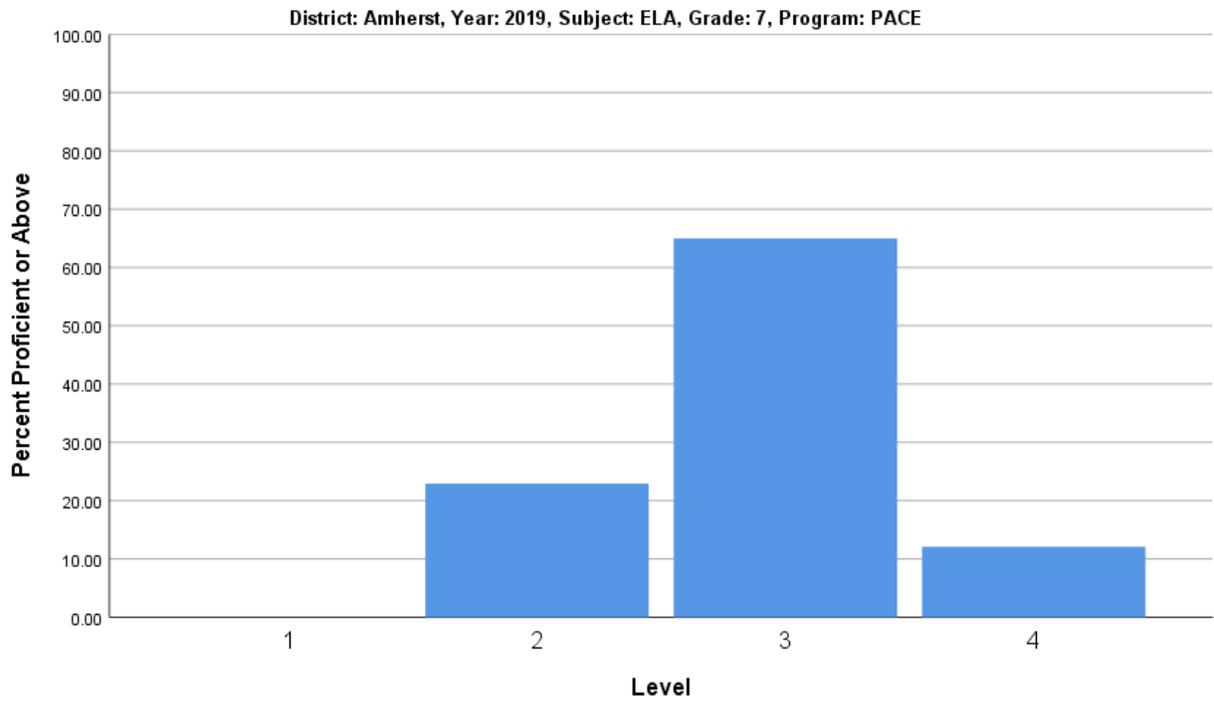
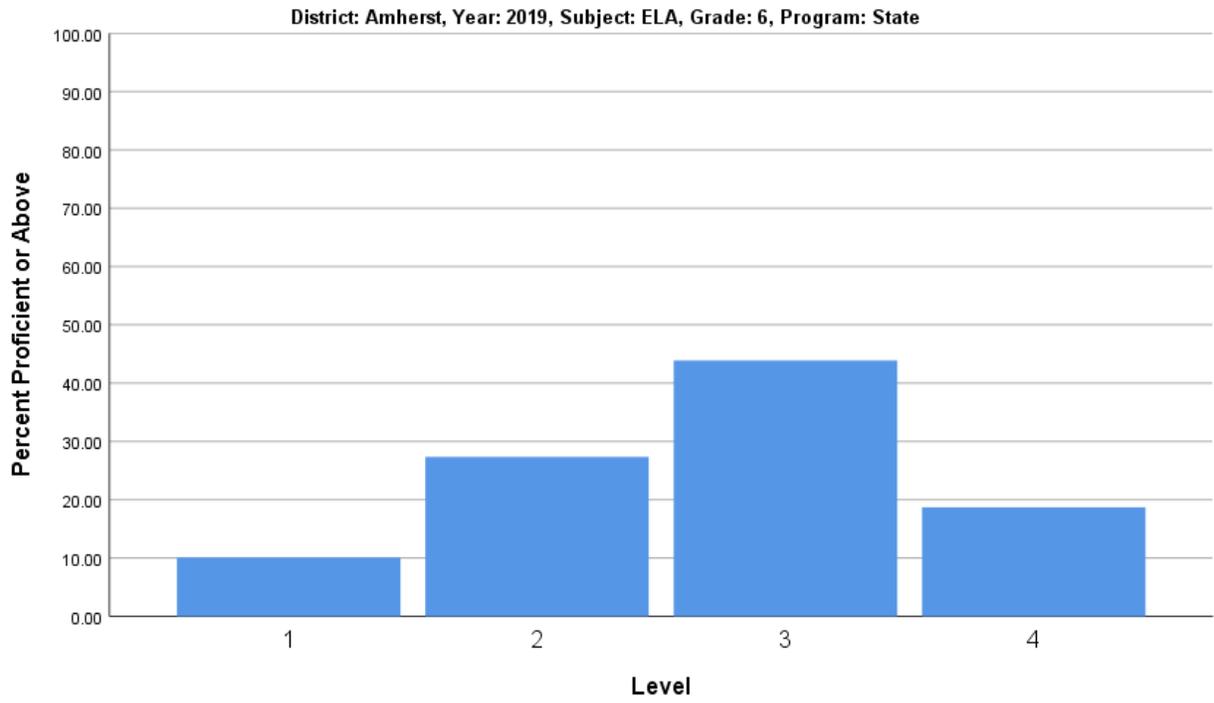




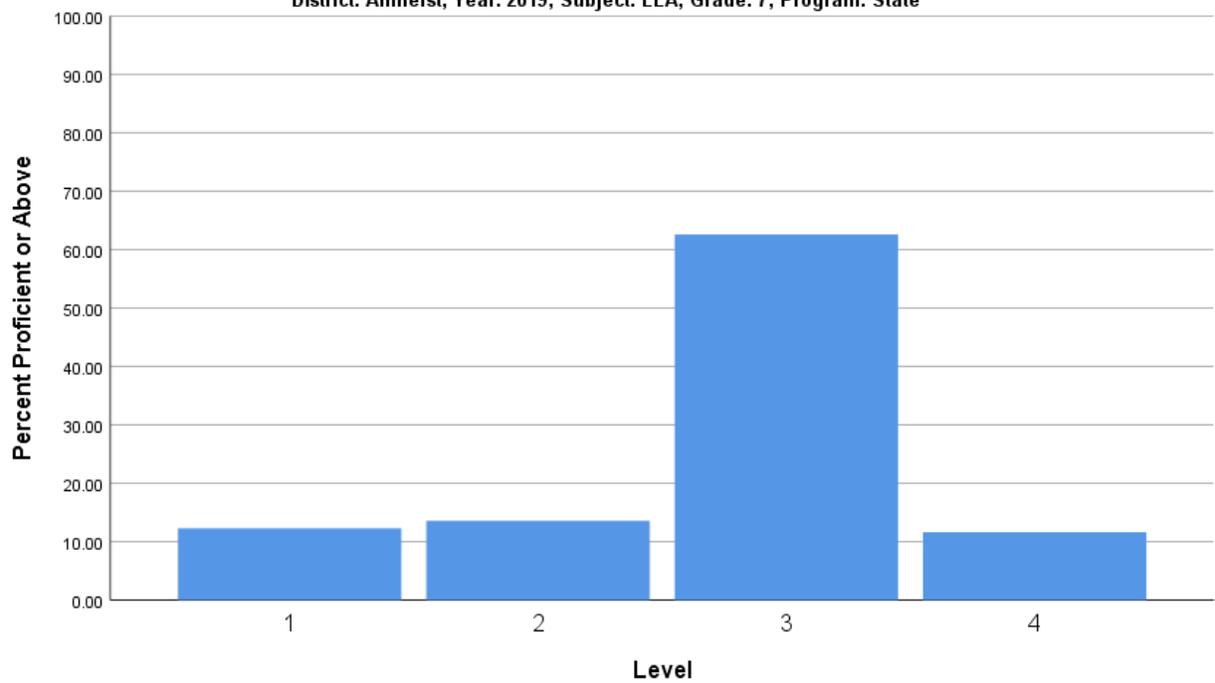


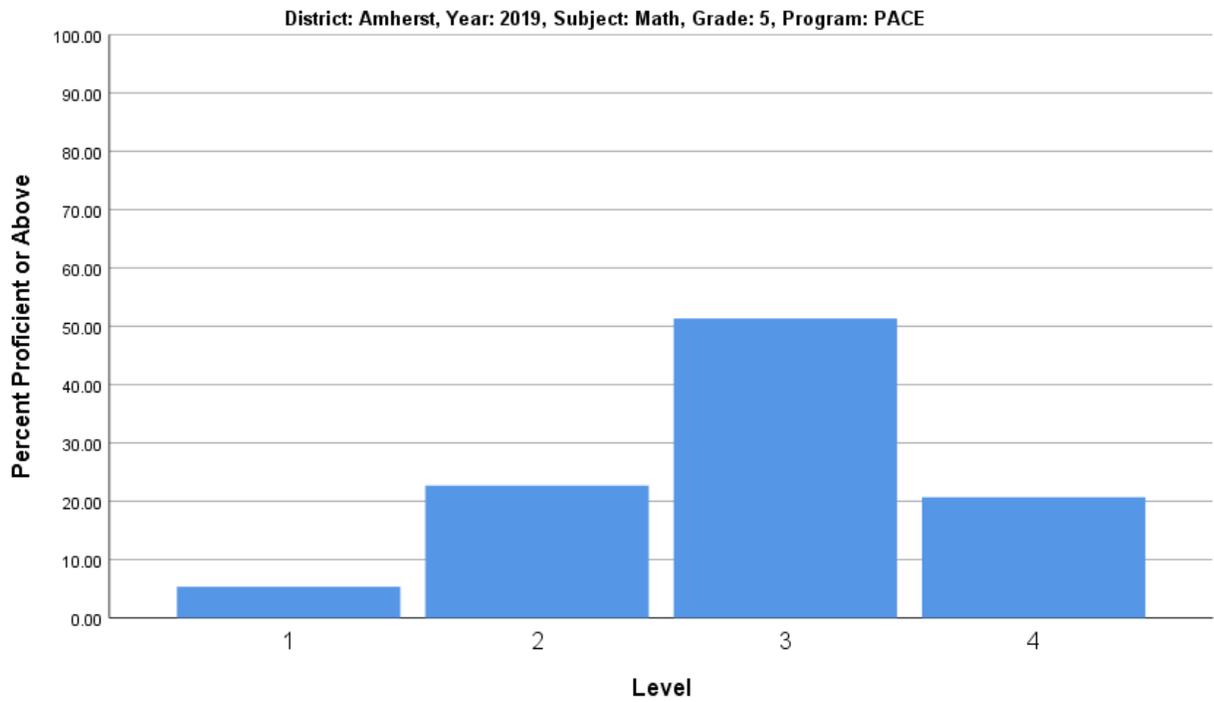
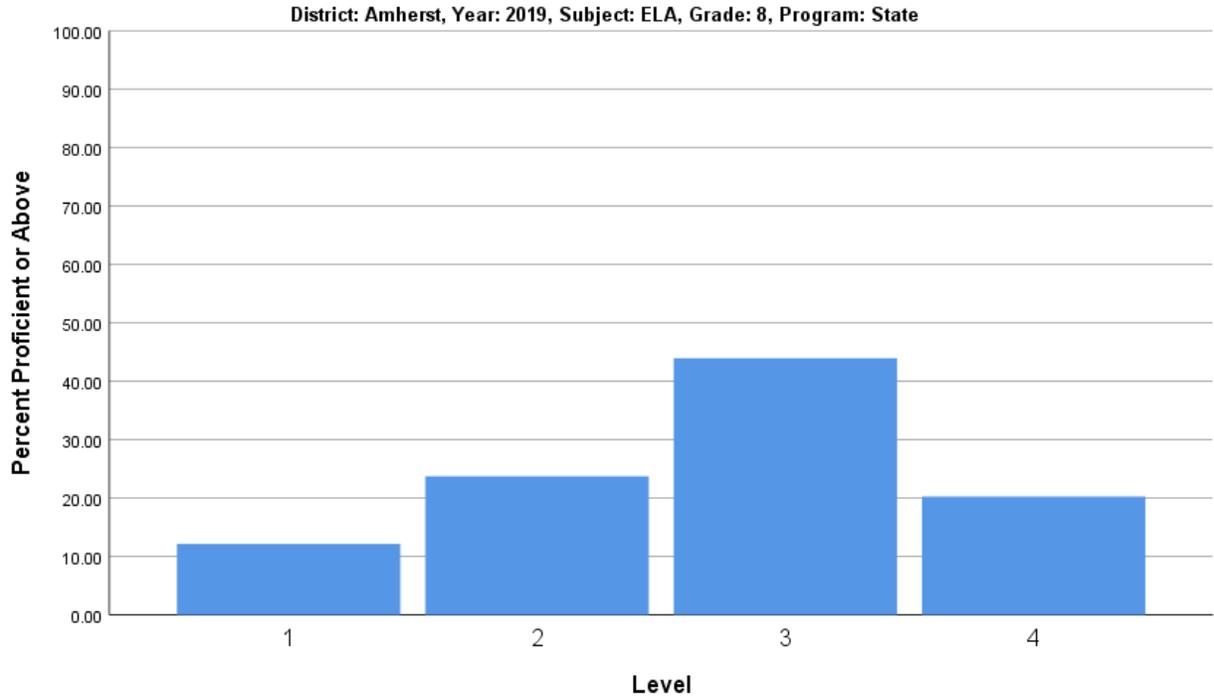
Performance Level Analysis by District

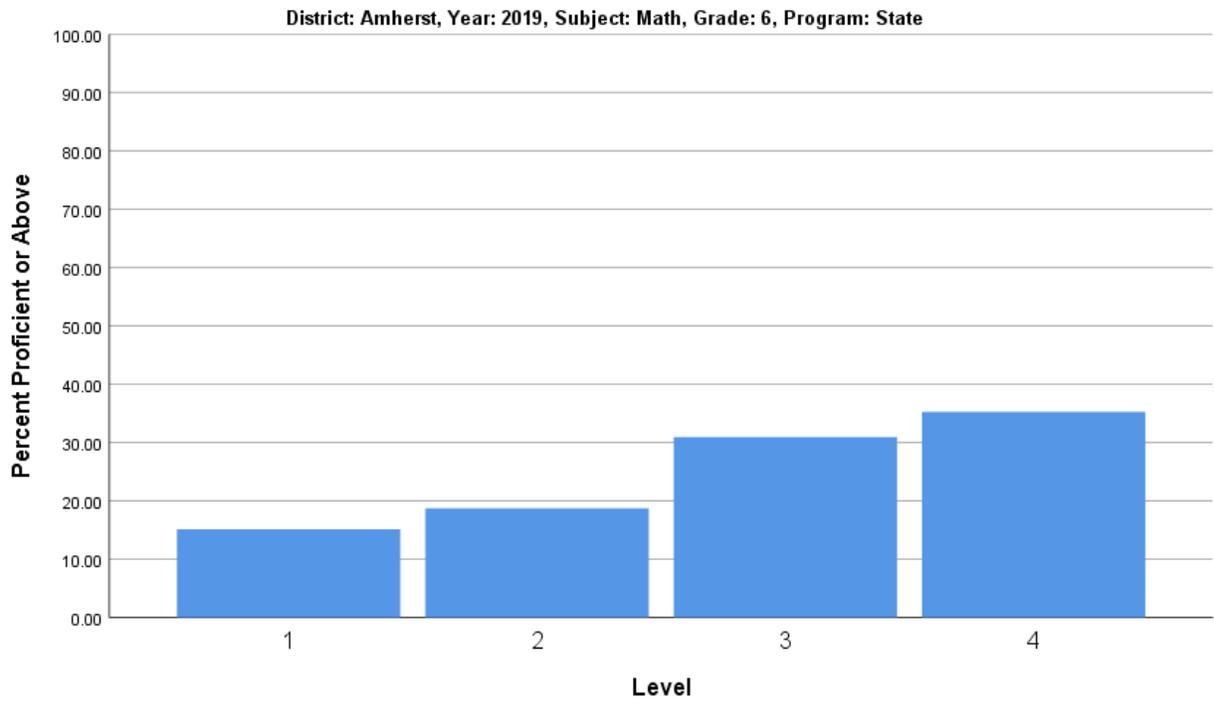
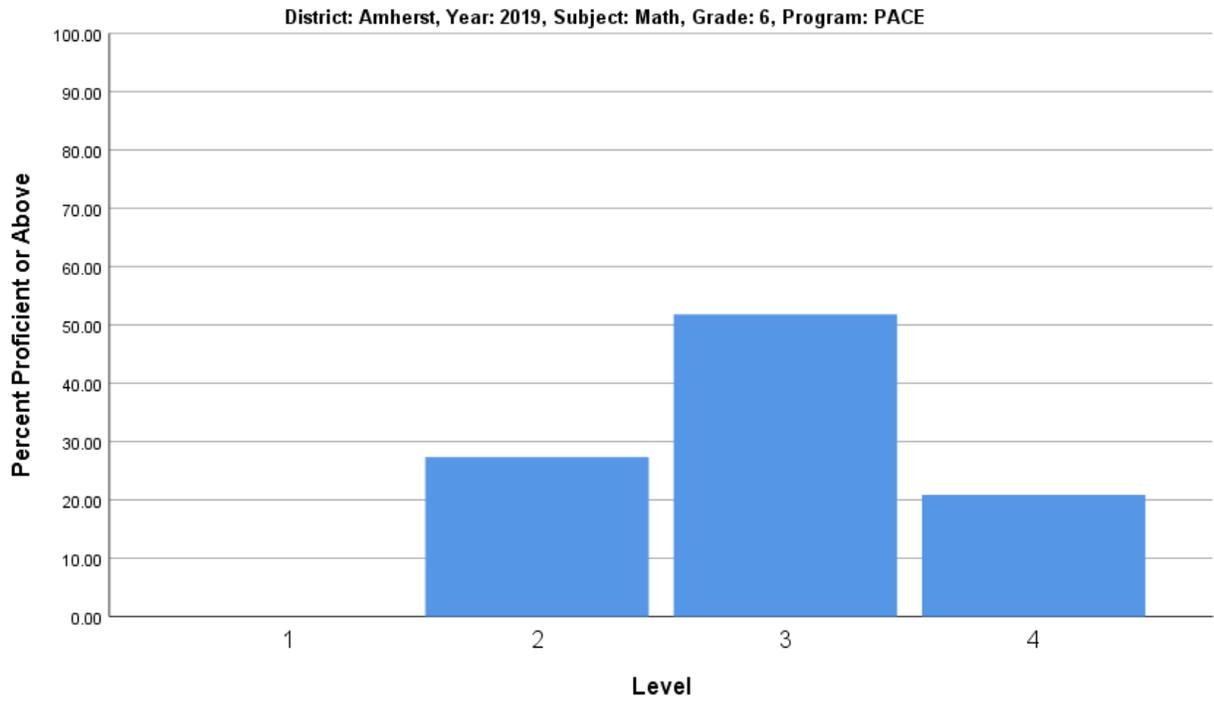




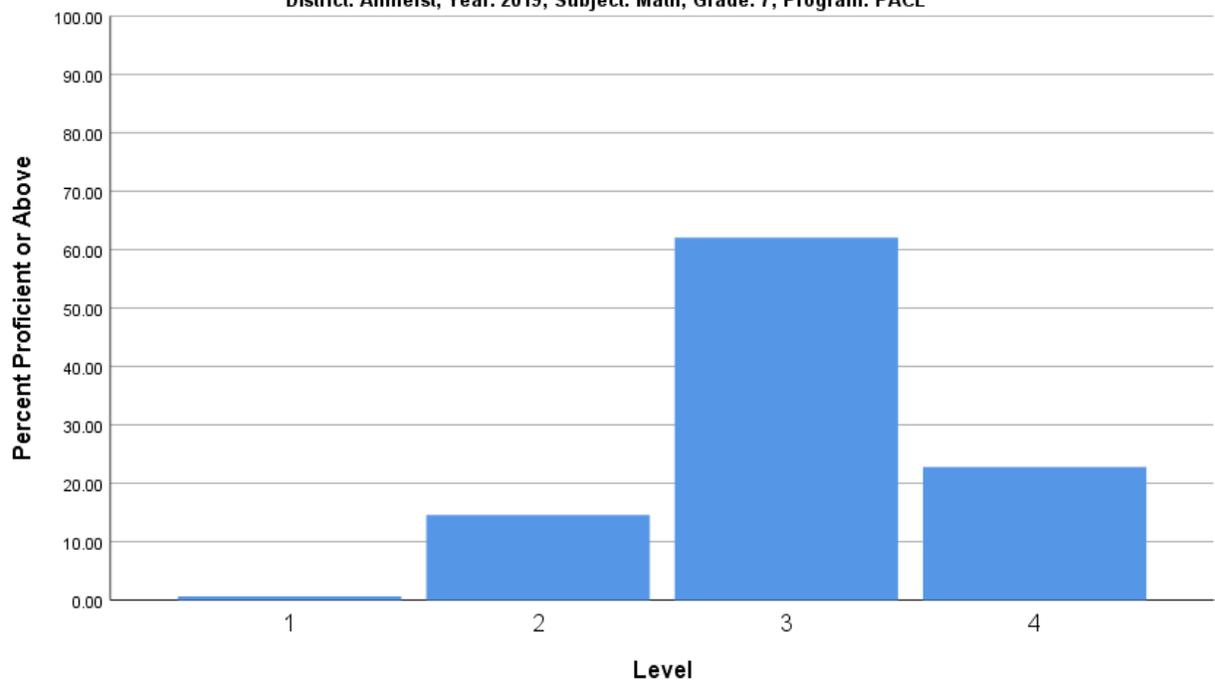
District: Amherst, Year: 2019, Subject: ELA, Grade: 7, Program: State

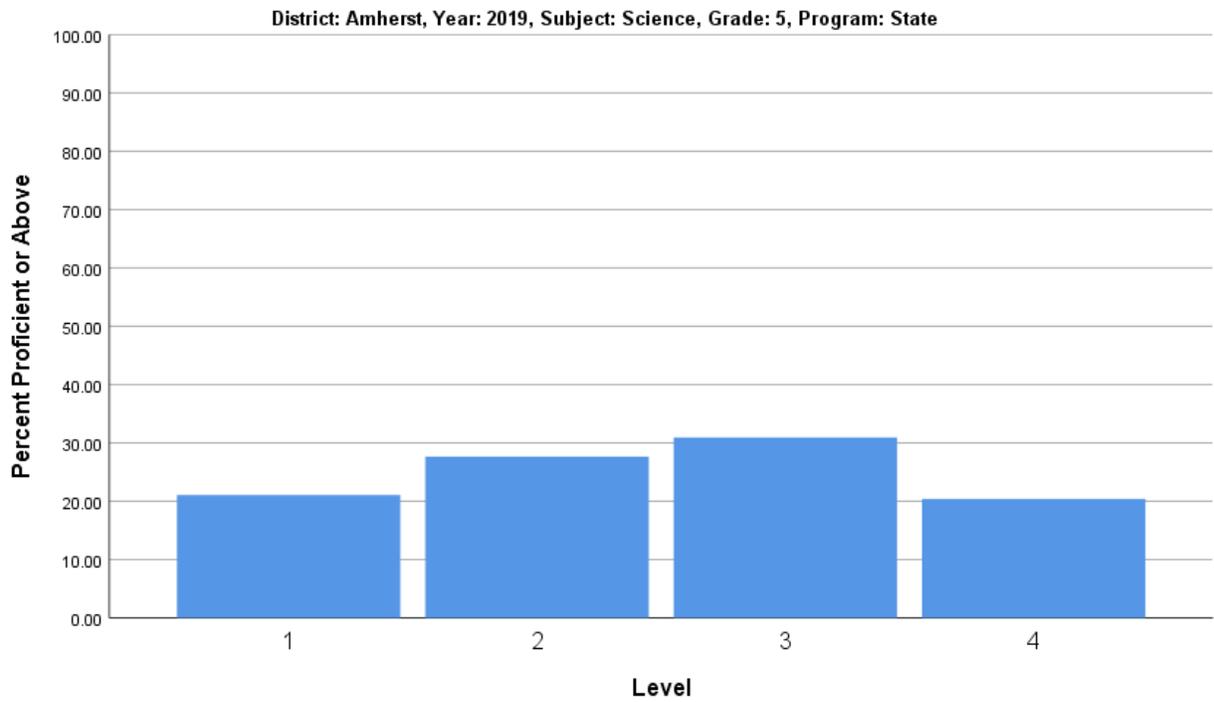
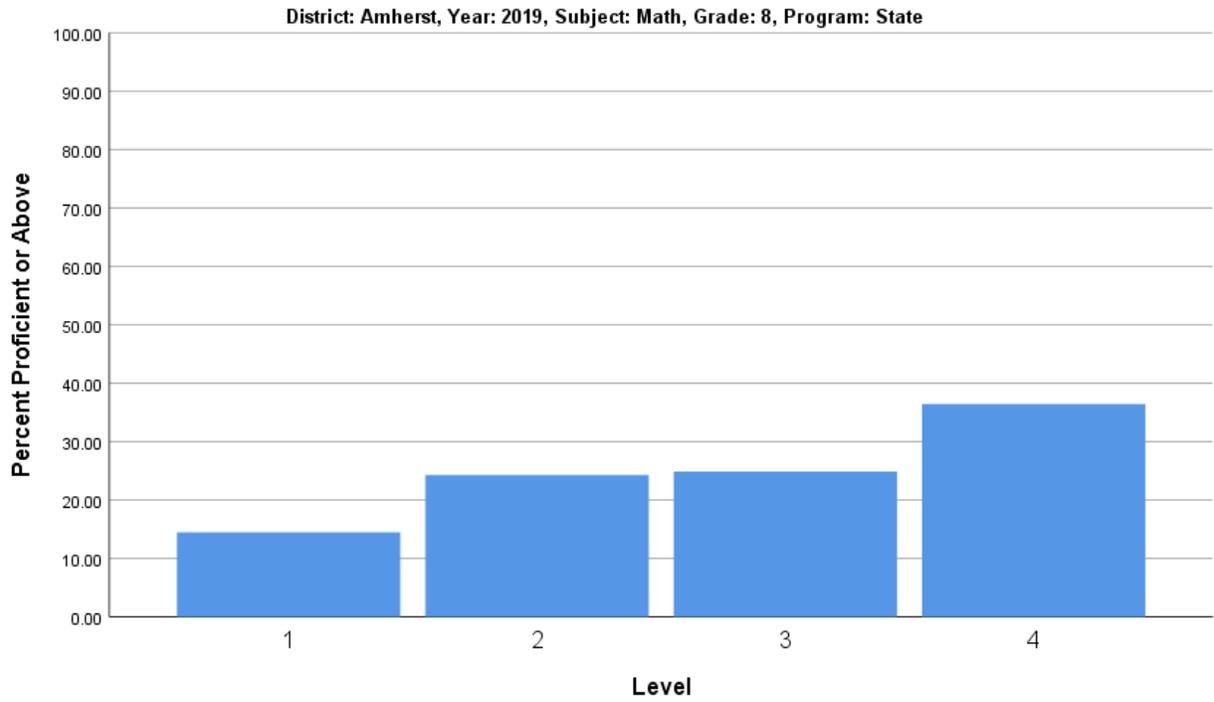




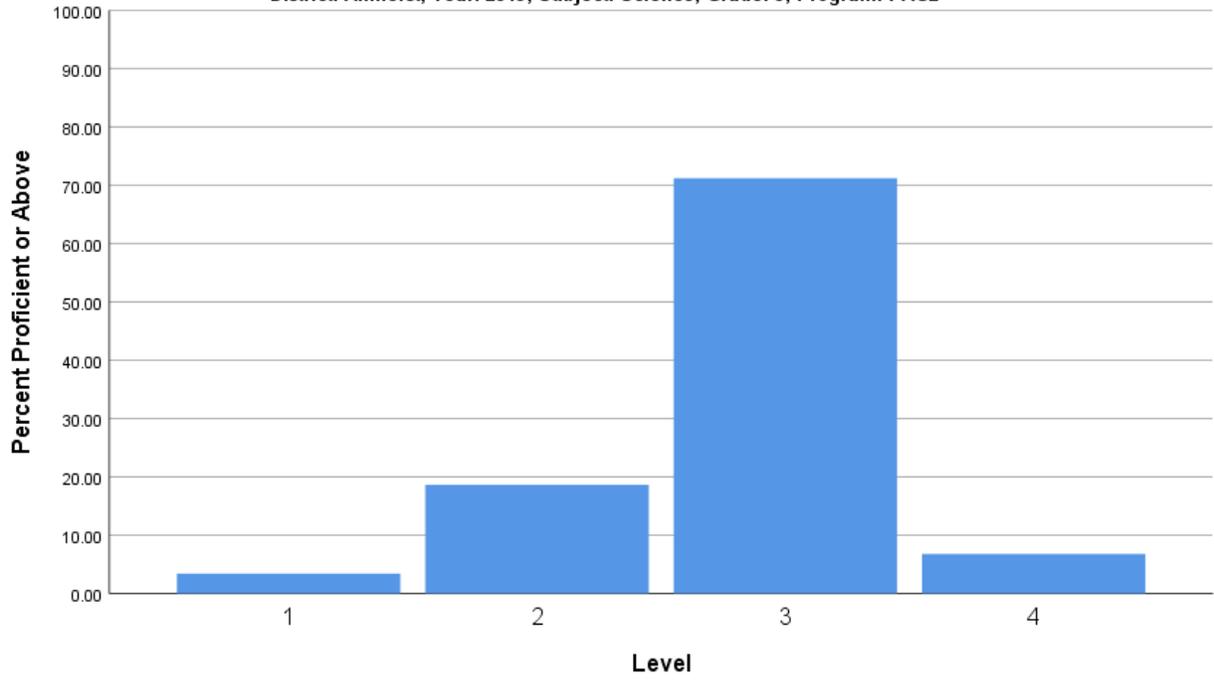


District: Amherst, Year: 2019, Subject: Math, Grade: 7, Program: PACE

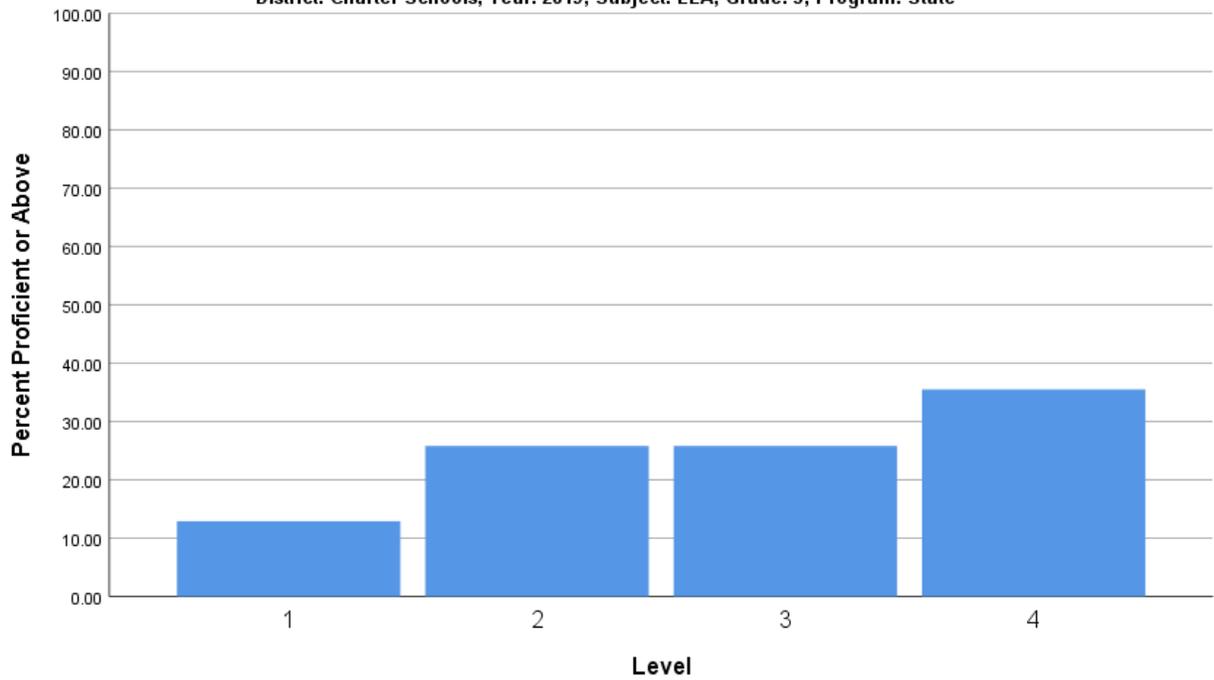




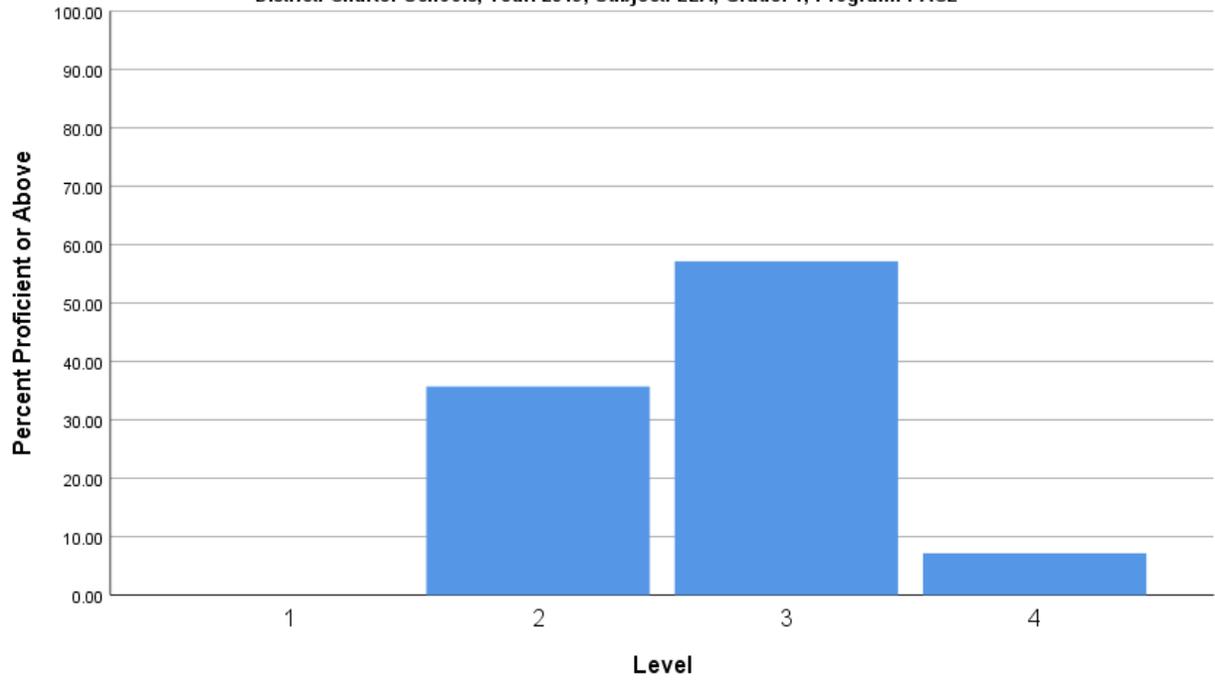
District: Amherst, Year: 2019, Subject: Science, Grade: 8, Program: PACE



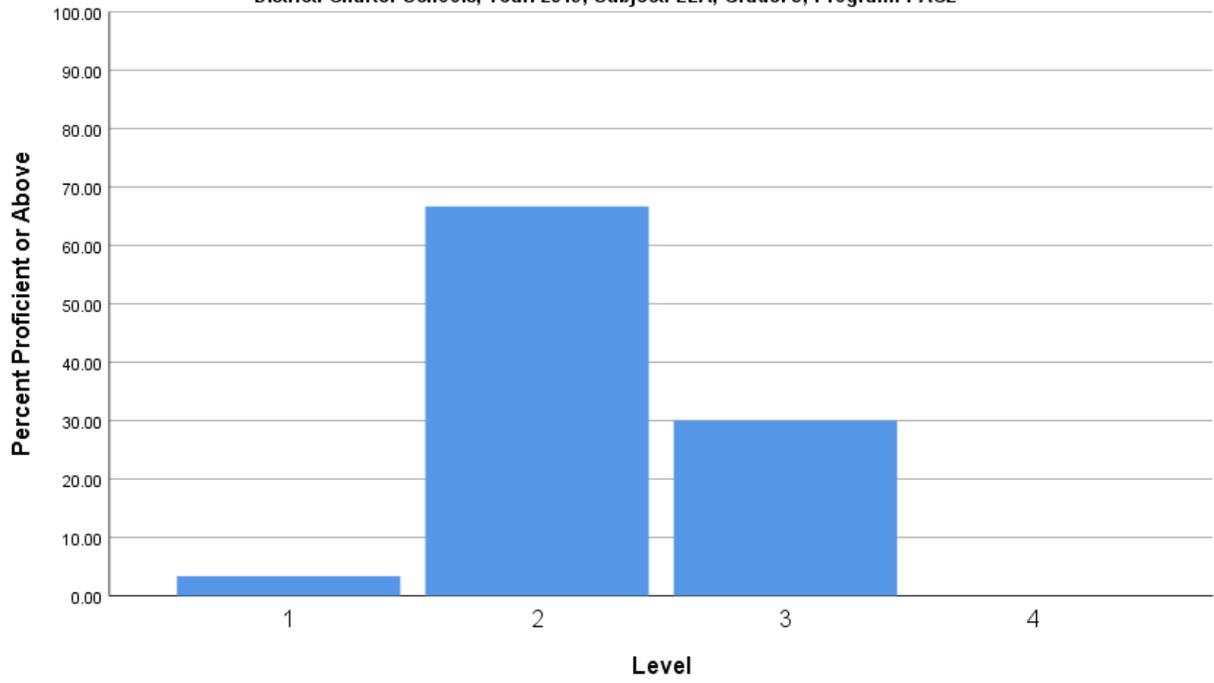
District: Charter Schools, Year: 2019, Subject: ELA, Grade: 3, Program: State



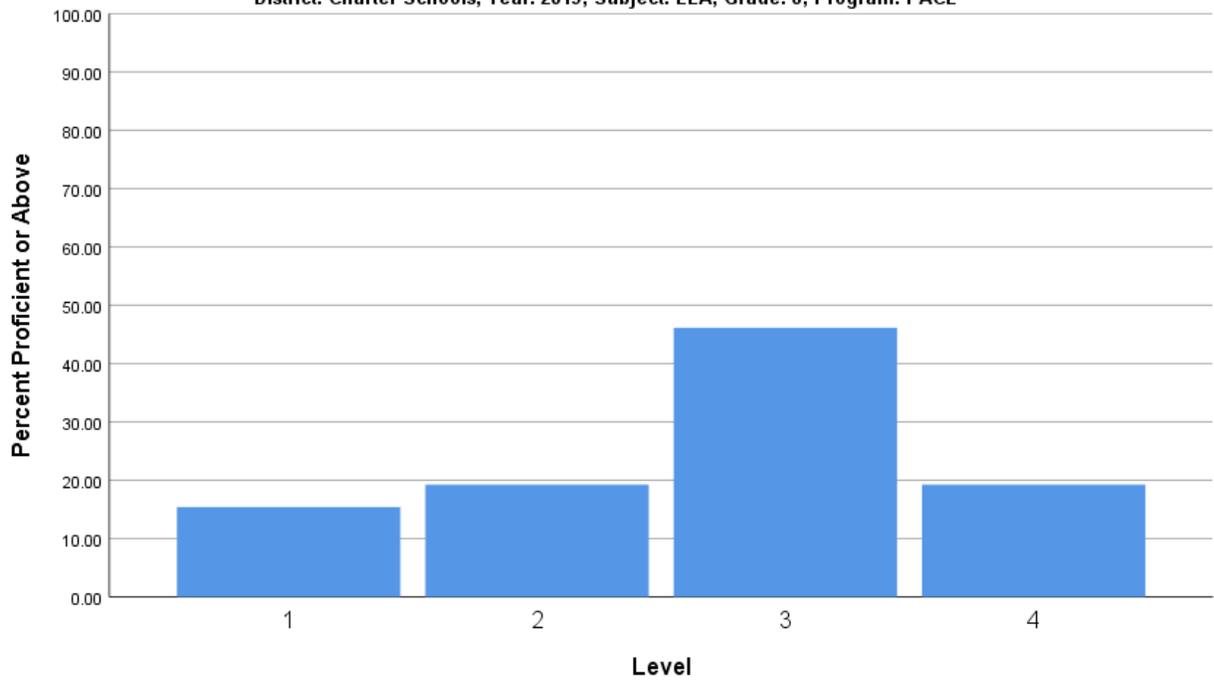
District: Charter Schools, Year: 2019, Subject: ELA, Grade: 4, Program: PACE



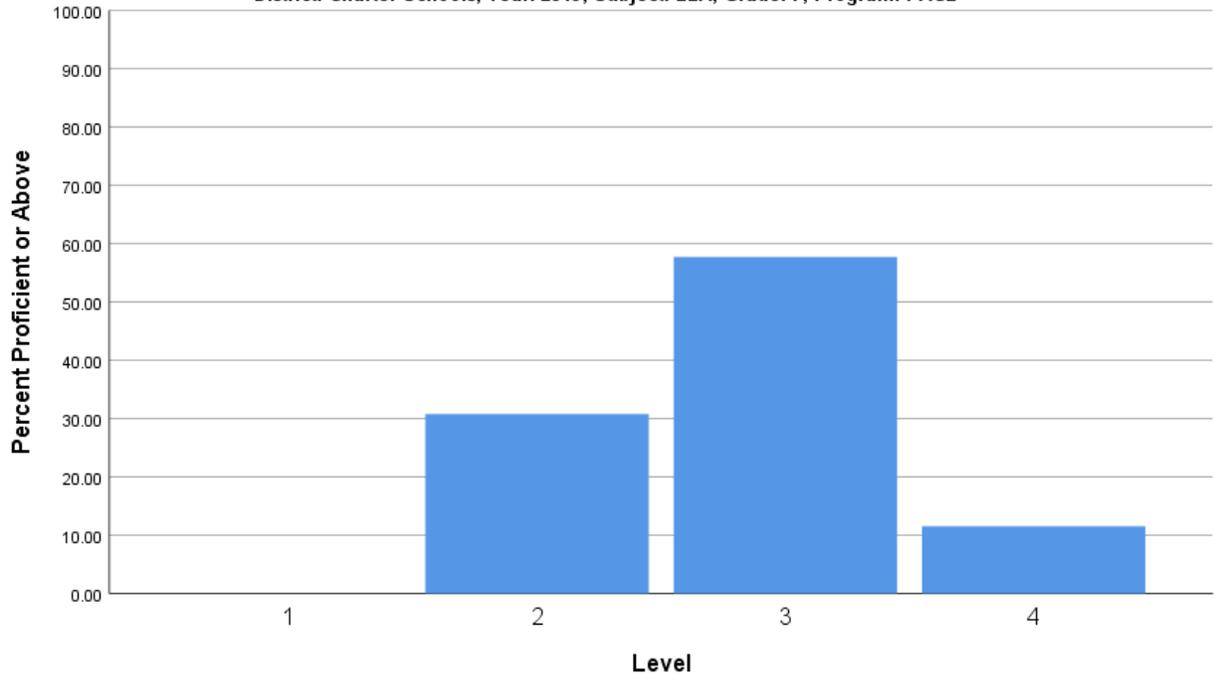
District: Charter Schools, Year: 2019, Subject: ELA, Grade: 5, Program: PACE



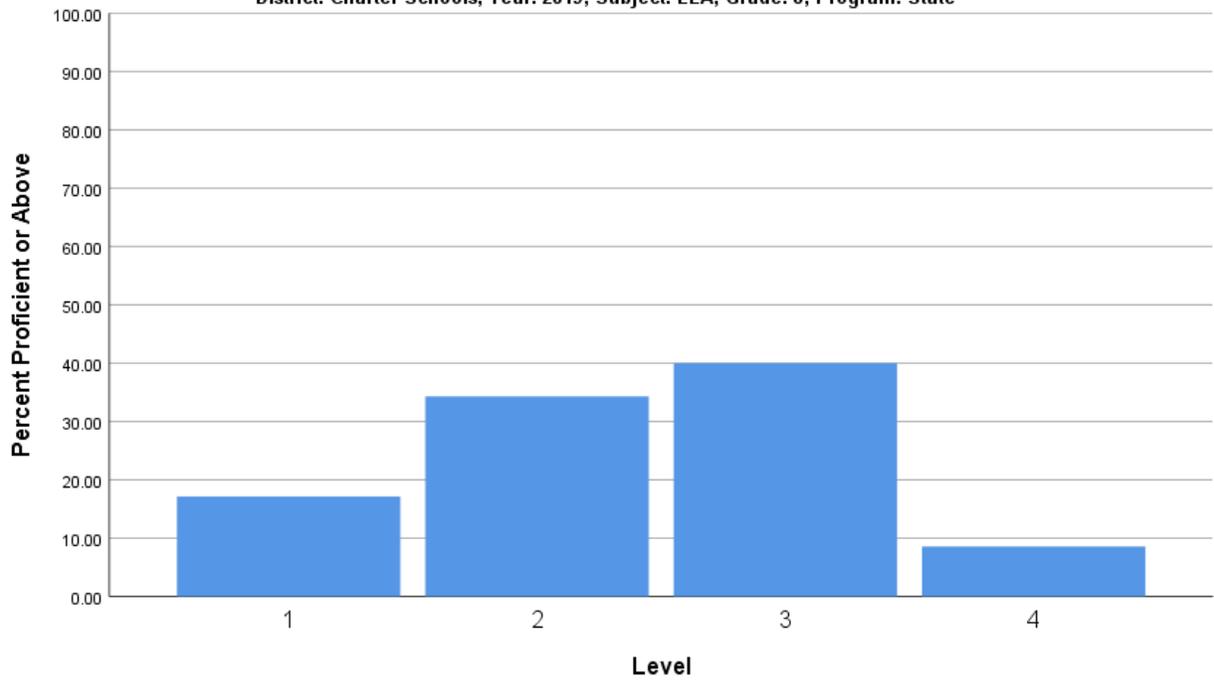
District: Charter Schools, Year: 2019, Subject: ELA, Grade: 6, Program: PACE



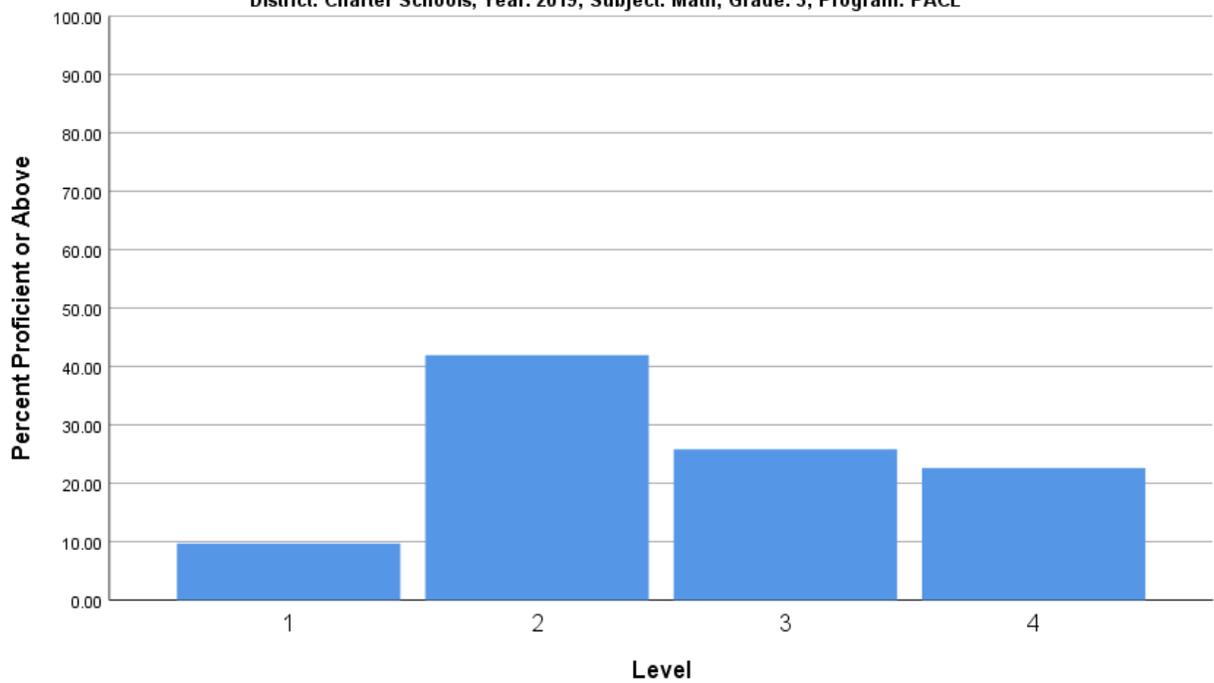
District: Charter Schools, Year: 2019, Subject: ELA, Grade: 7, Program: PACE



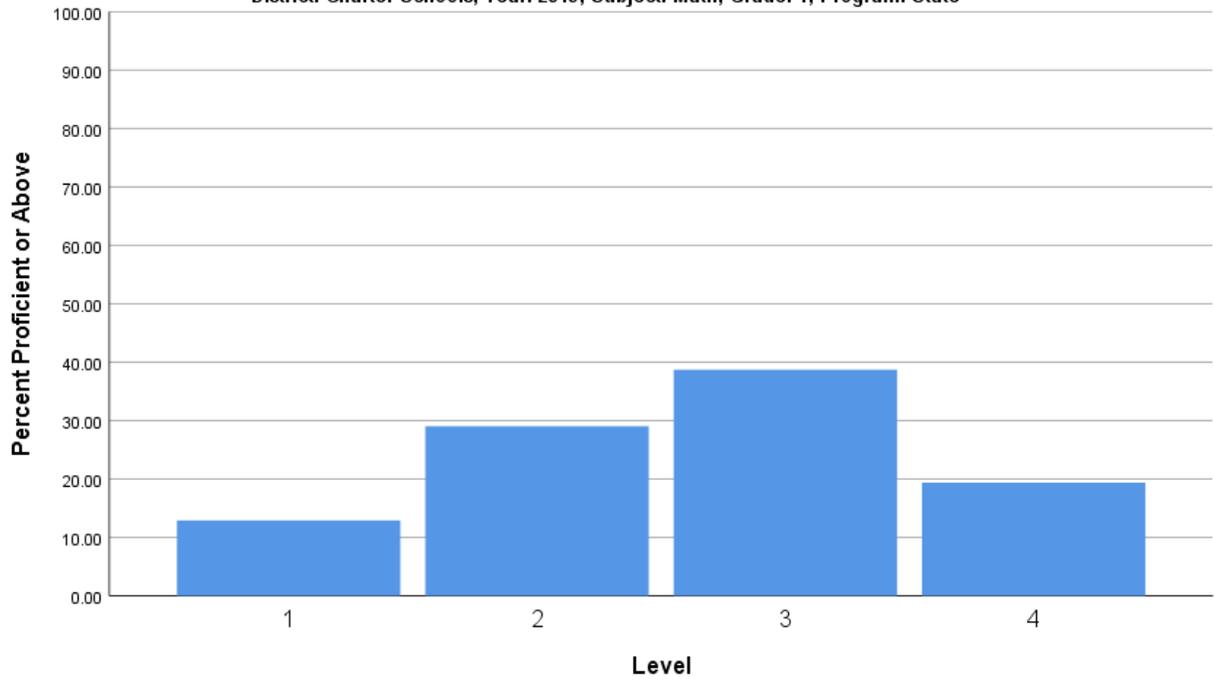
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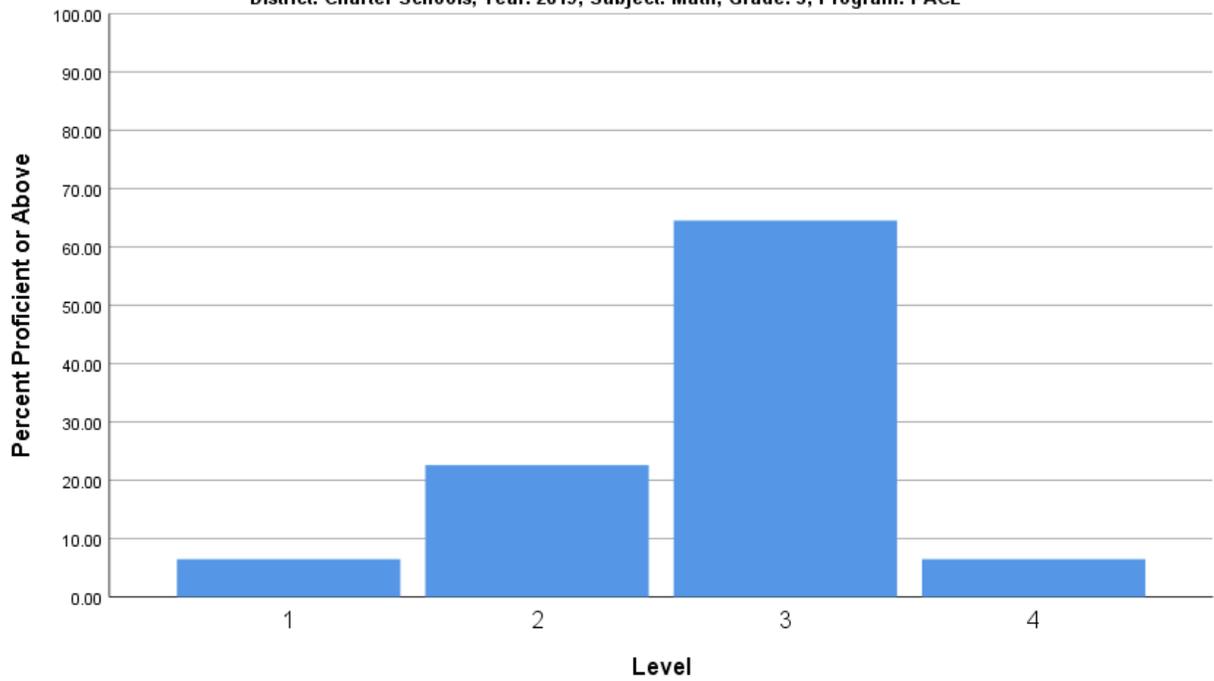
District: Charter Schools, Year: 2019, Subject: Math, Grade: 3, Program: PACE



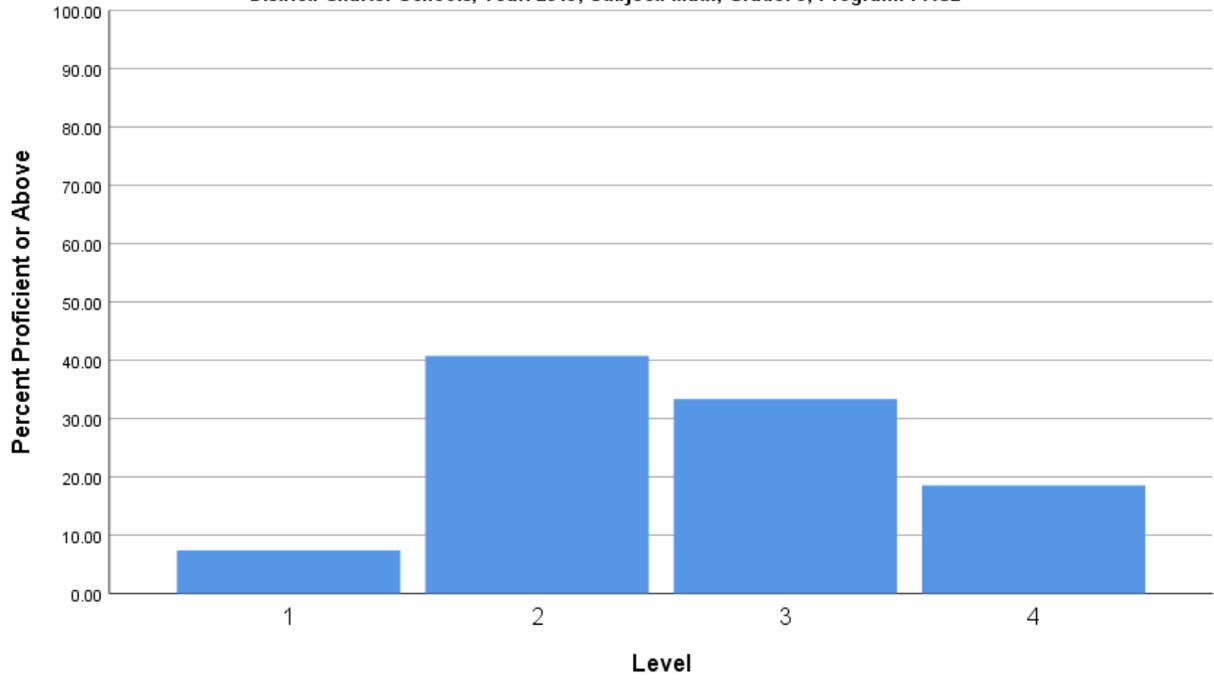
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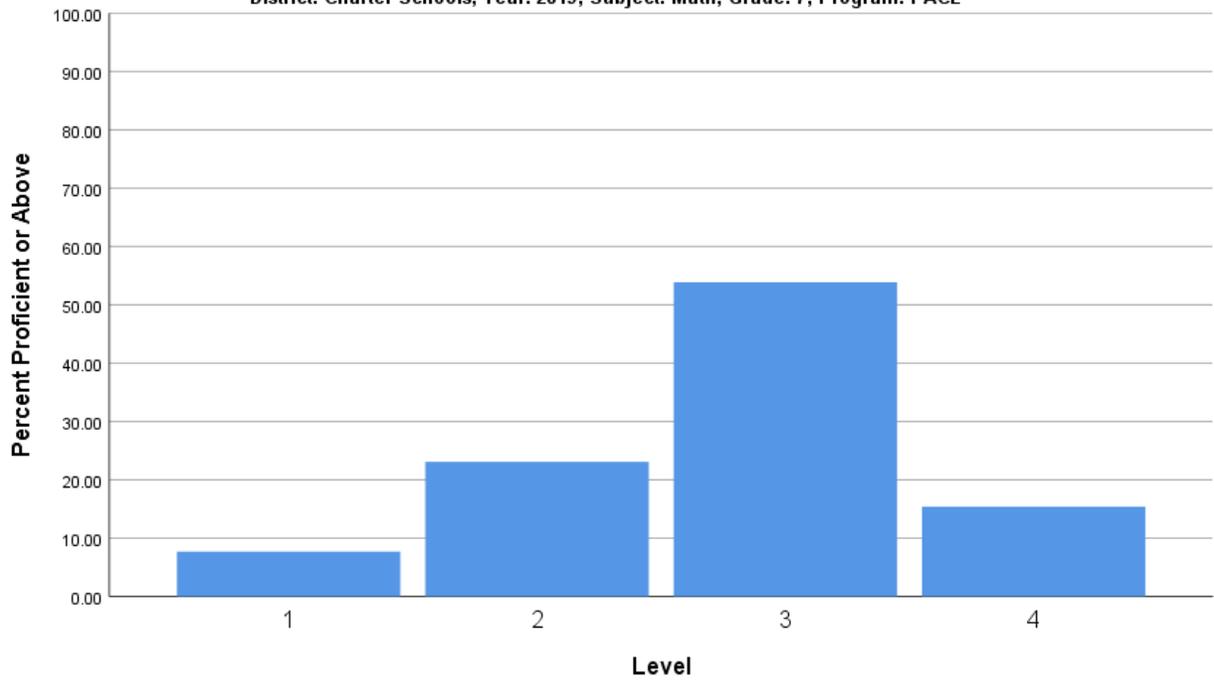
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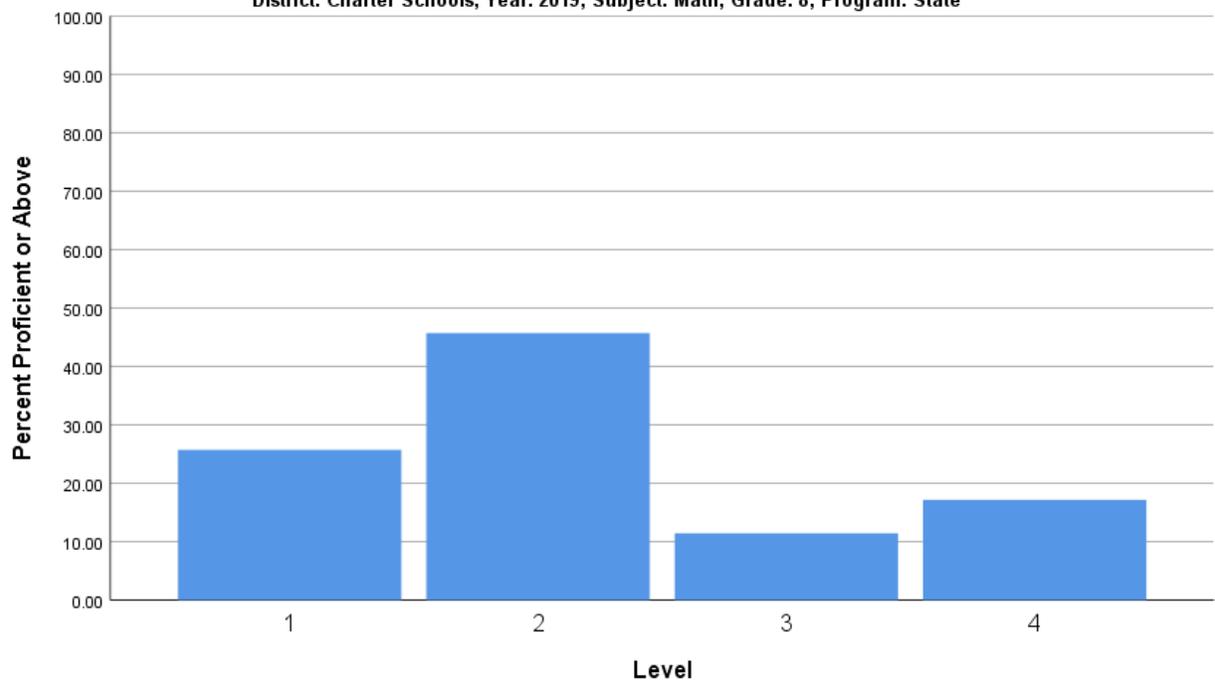
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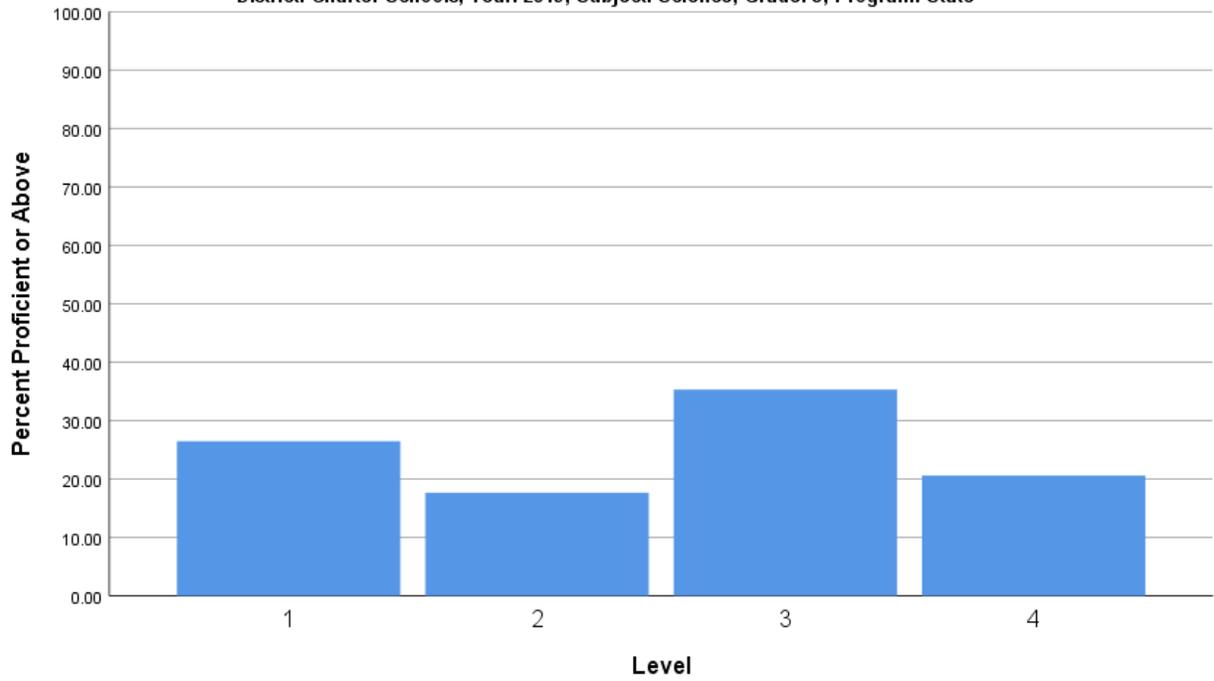
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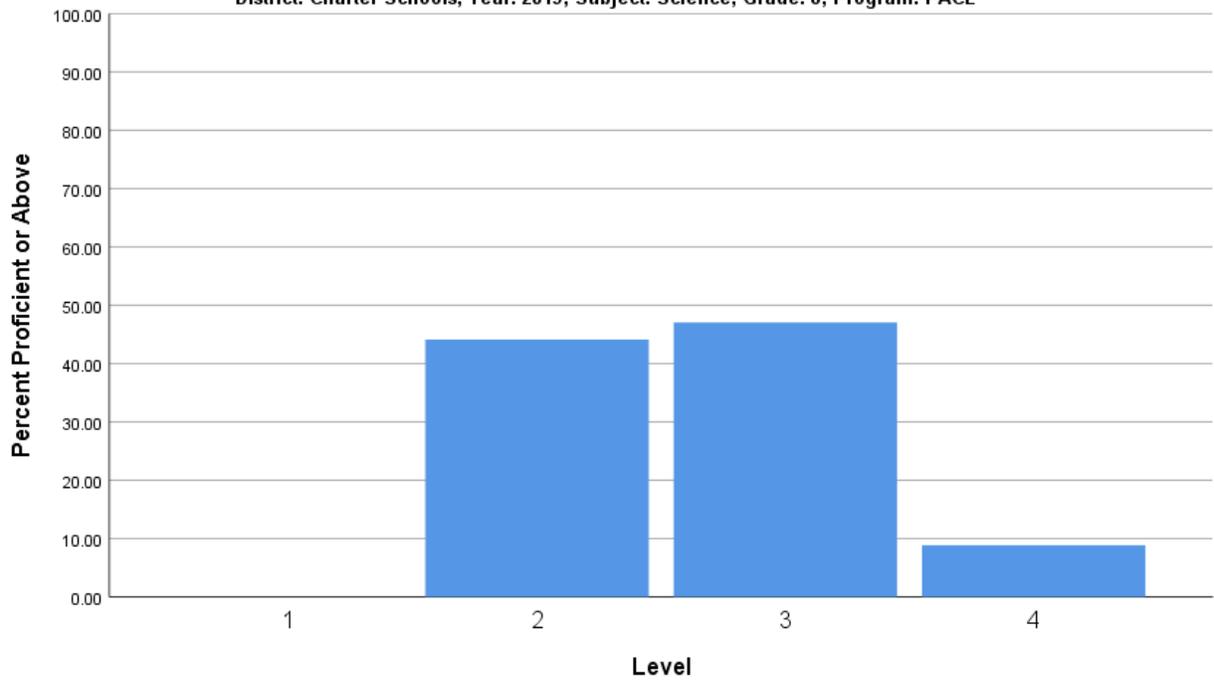
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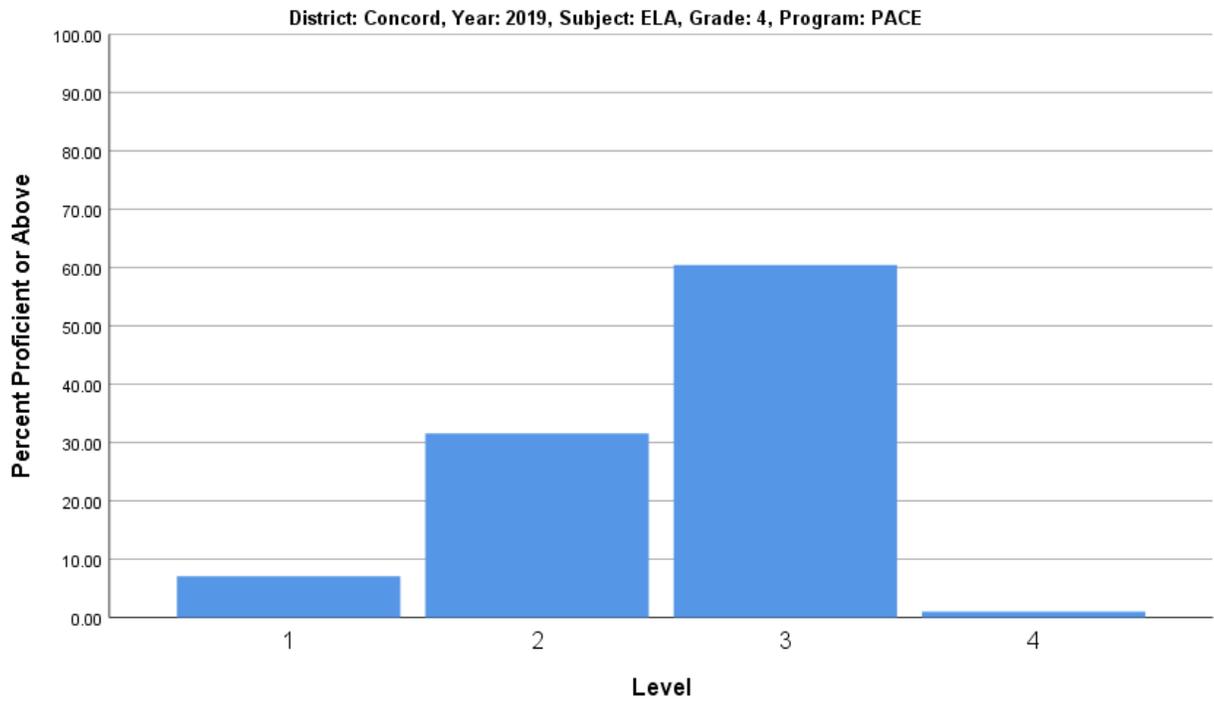
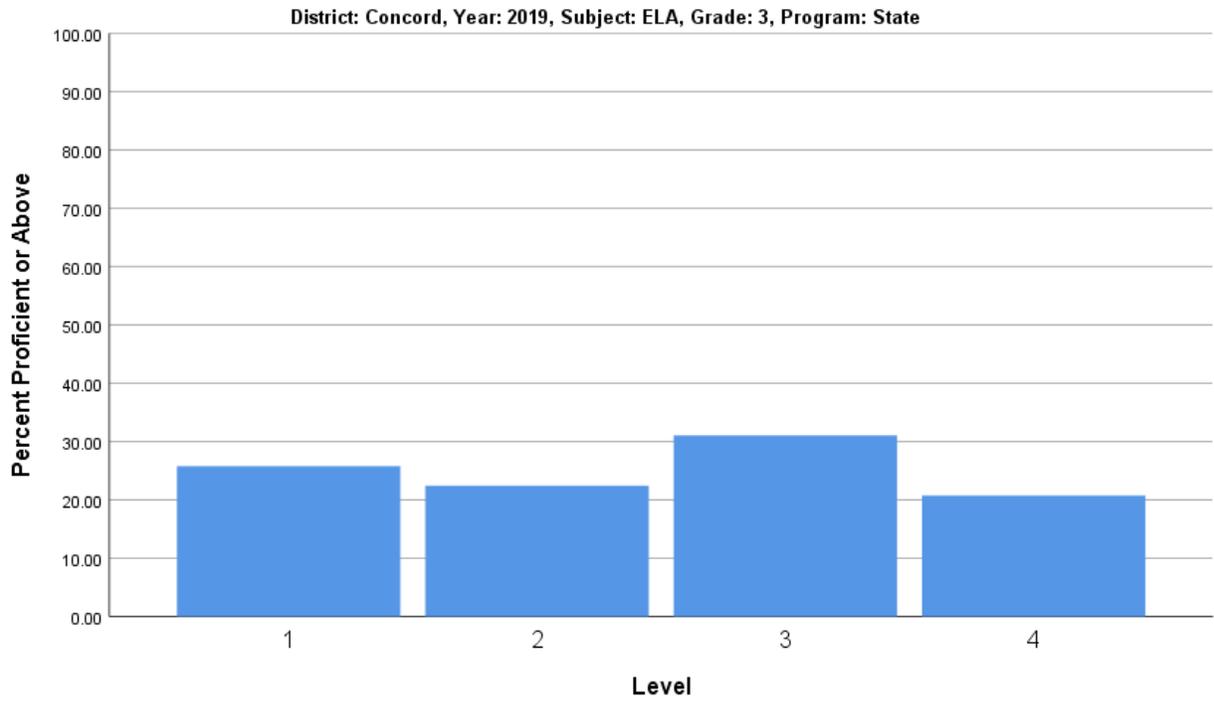


District: Charter Schools, Year: 2019, Subject: Science, Grade: 5, Program: State

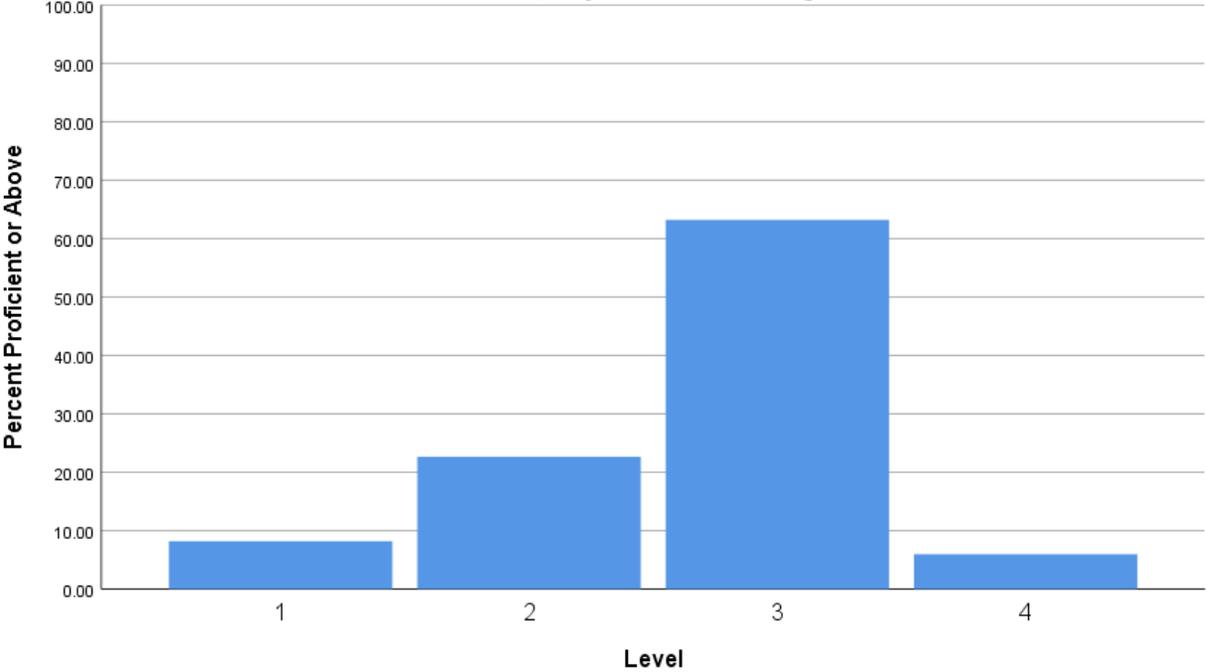


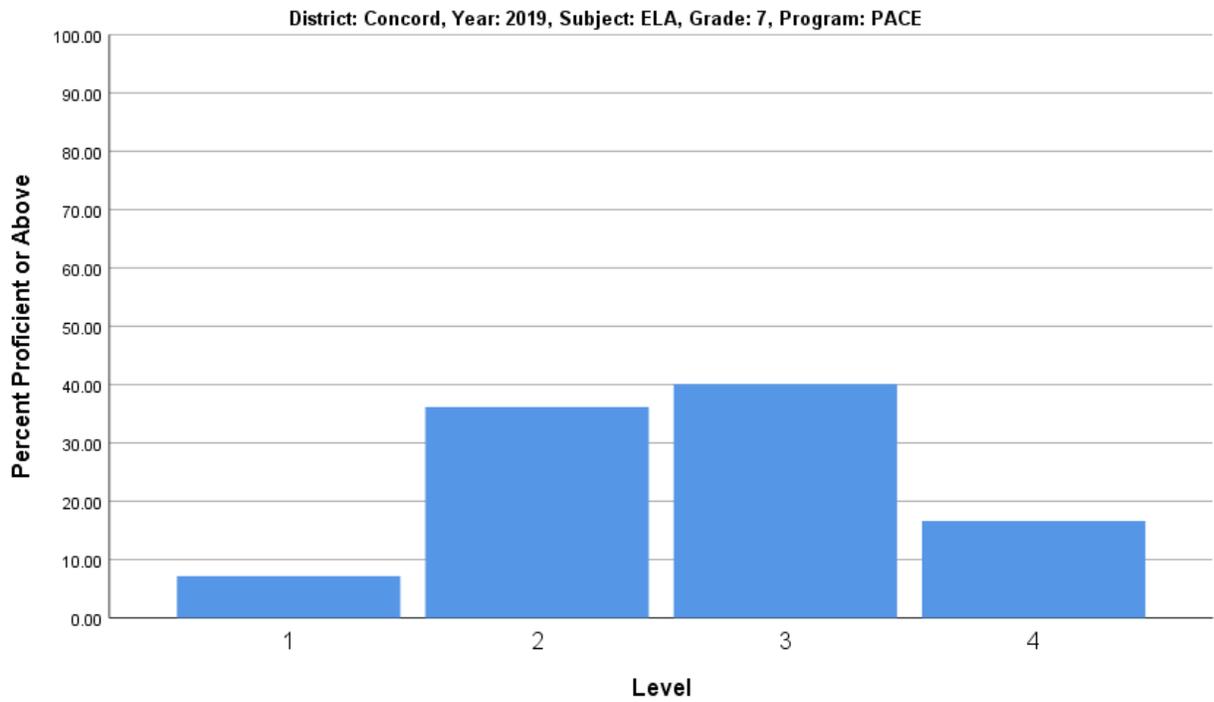
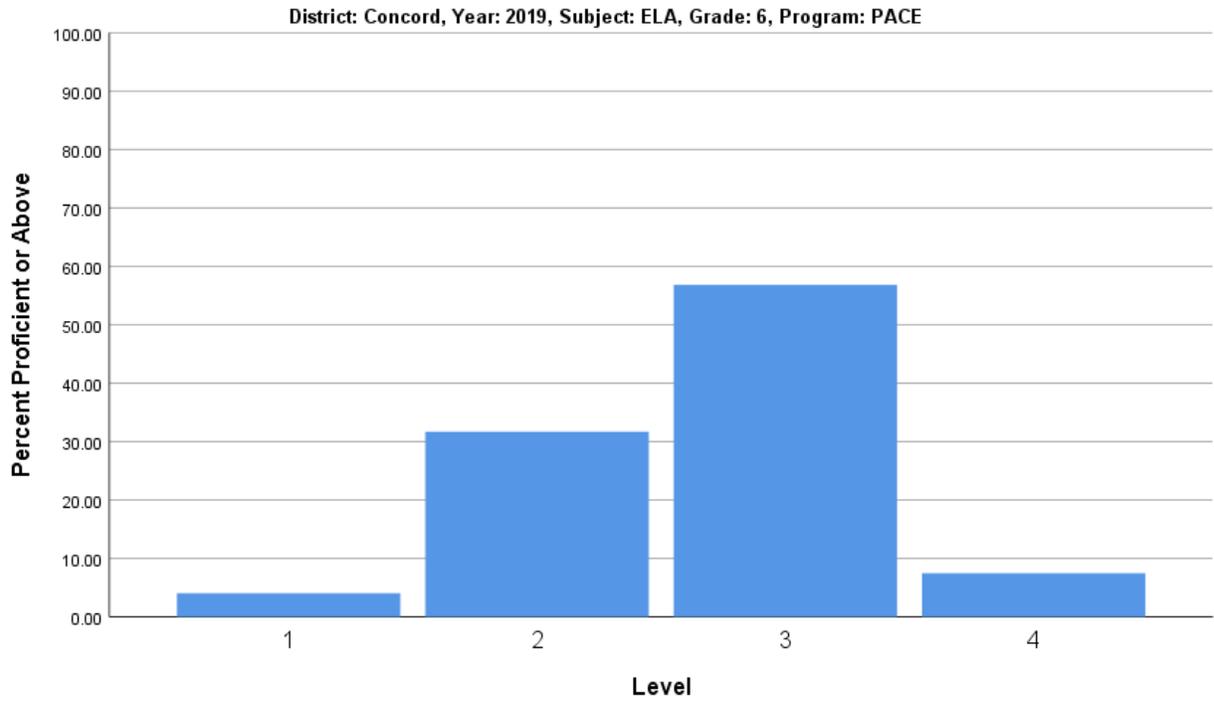
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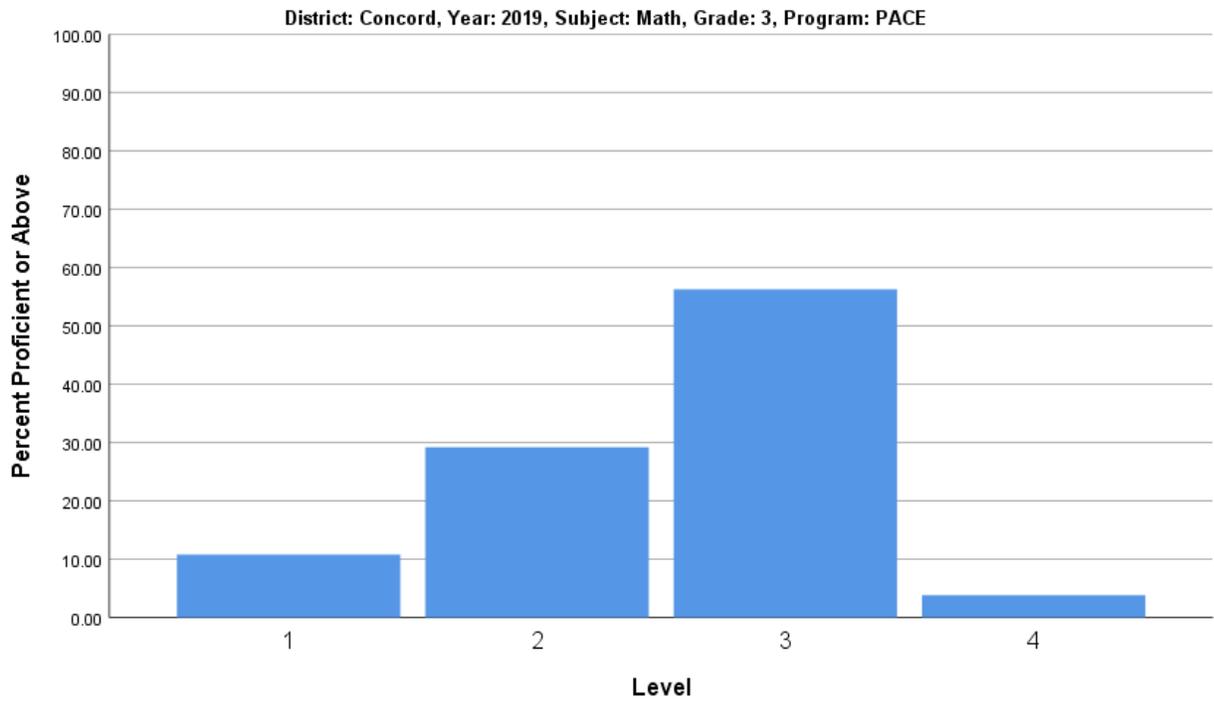
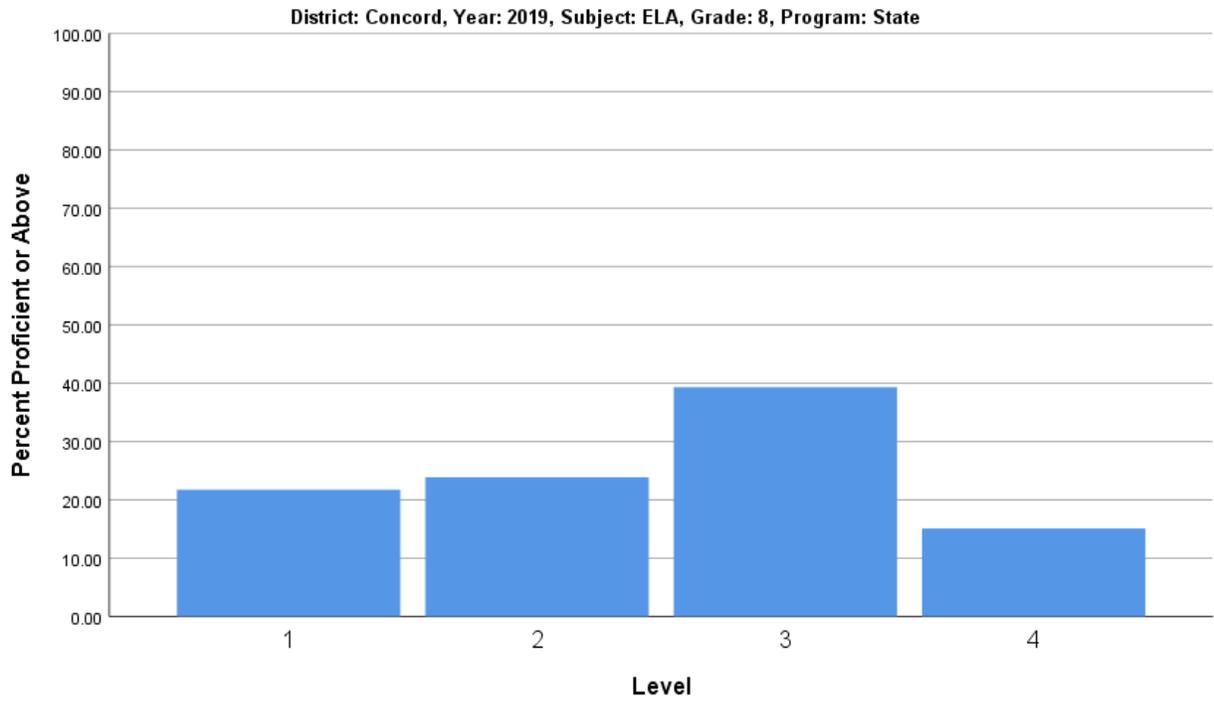




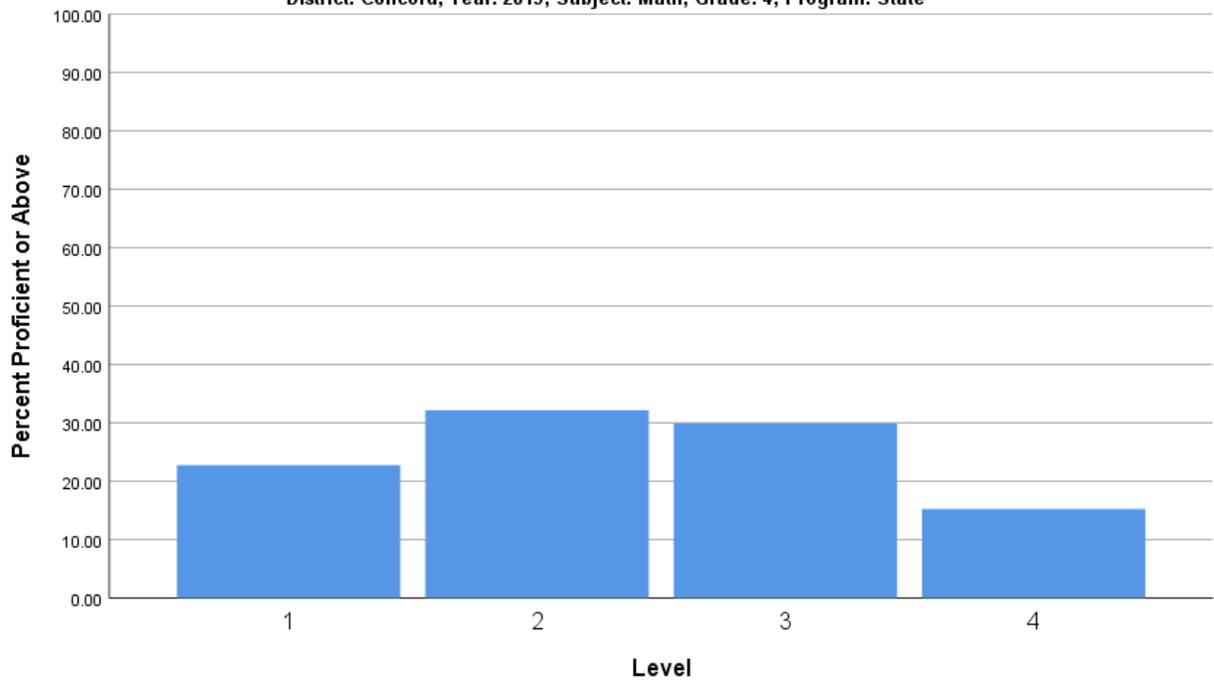
District: Concord, Year: 2019, Subject: ELA, Grade: 5, Program: PACE

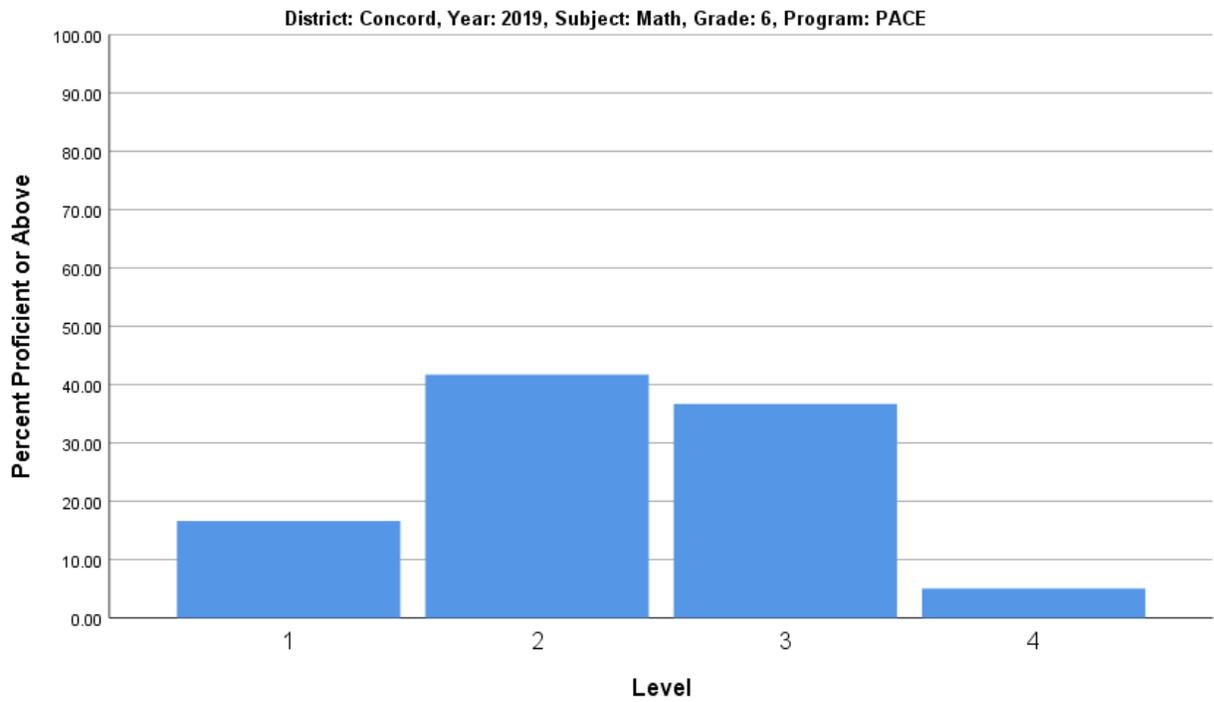
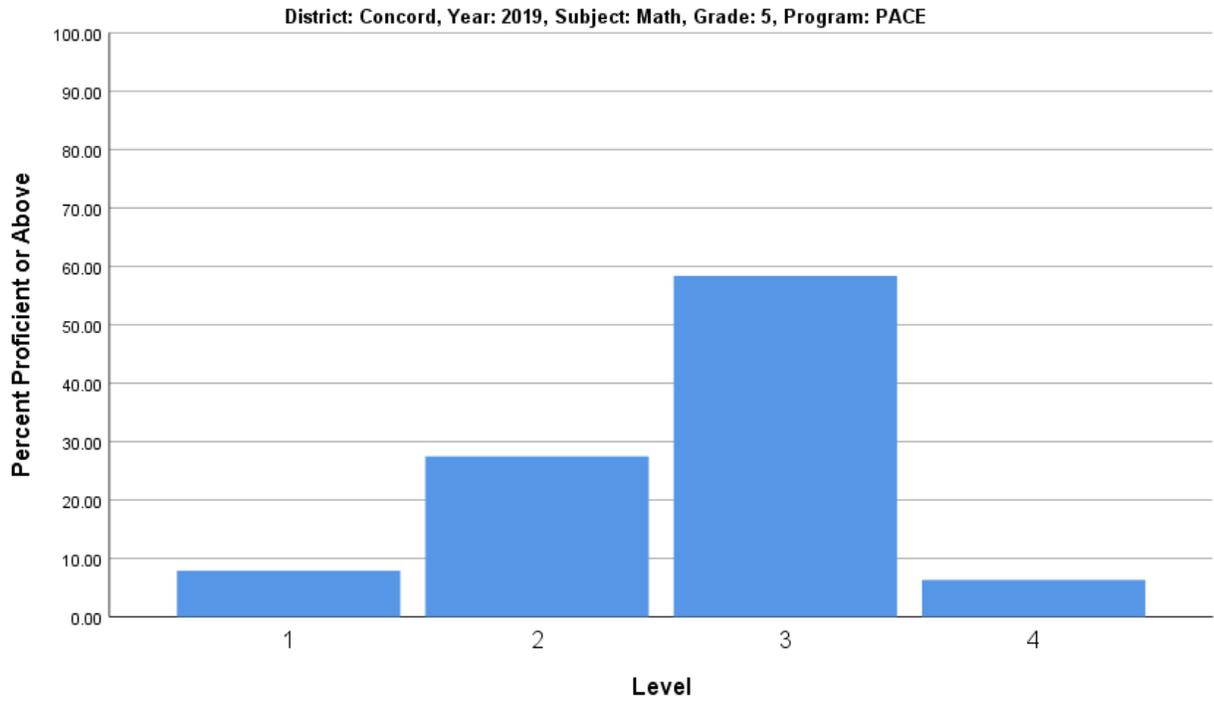


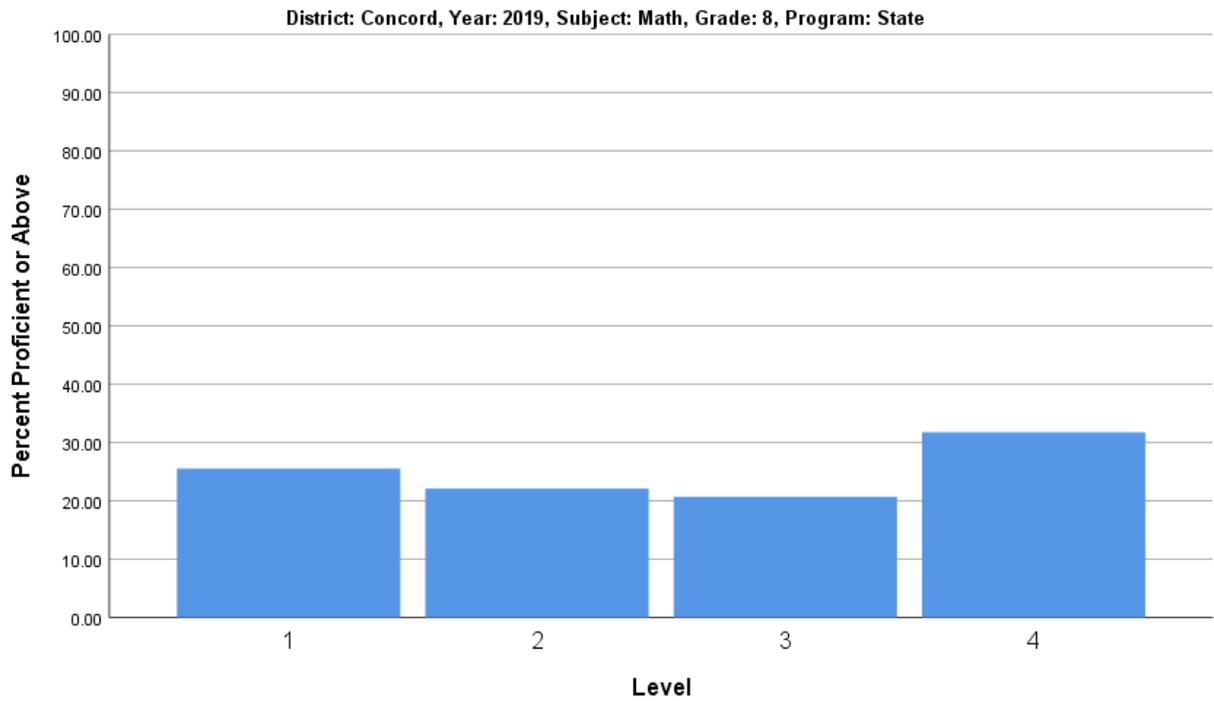
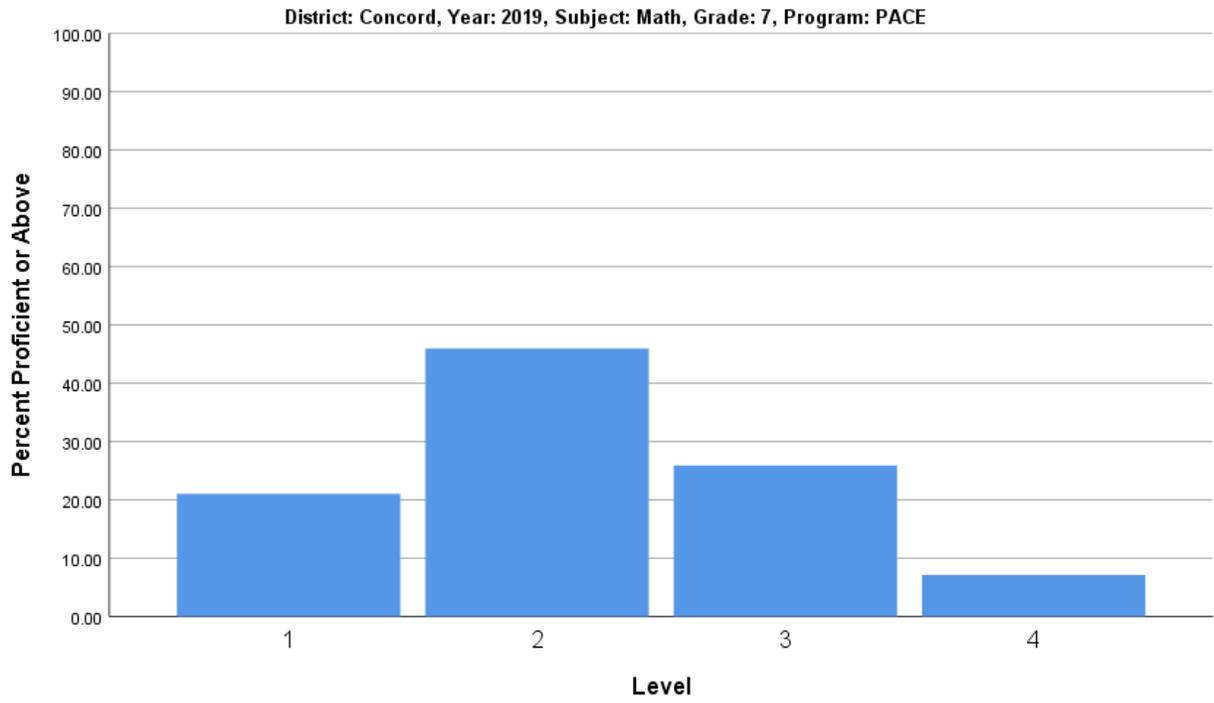




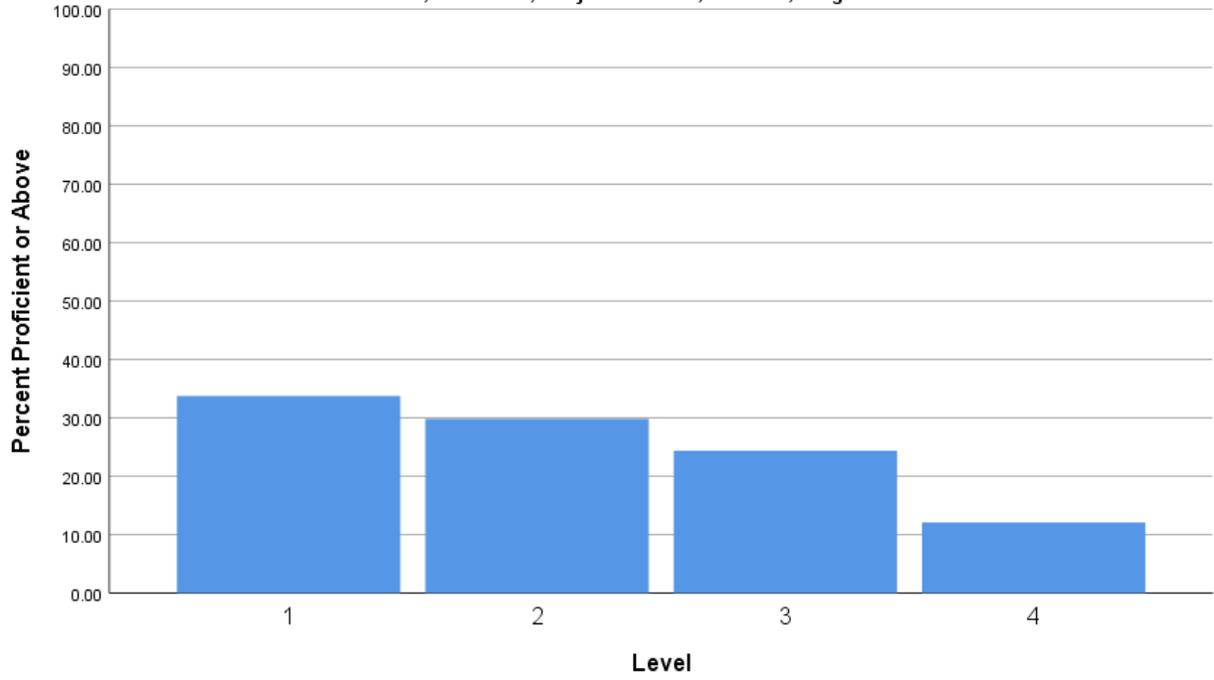
District: Concord, Year: 2019, Subject: Math, Grade: 4, Program: State



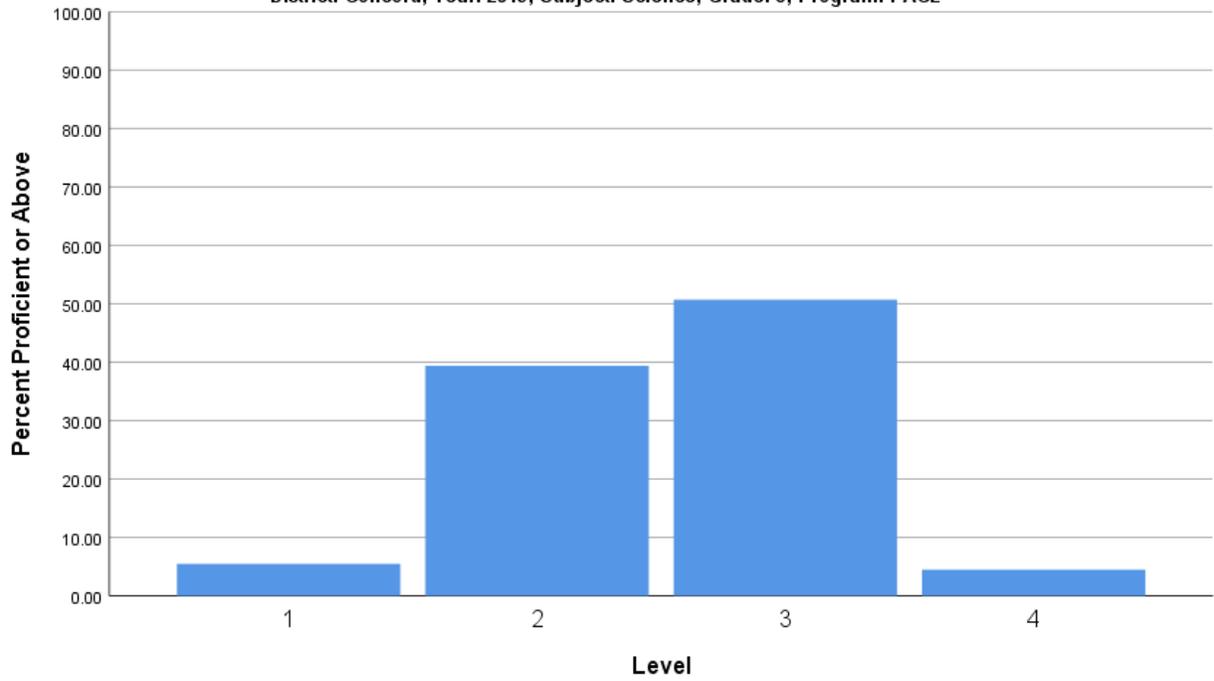




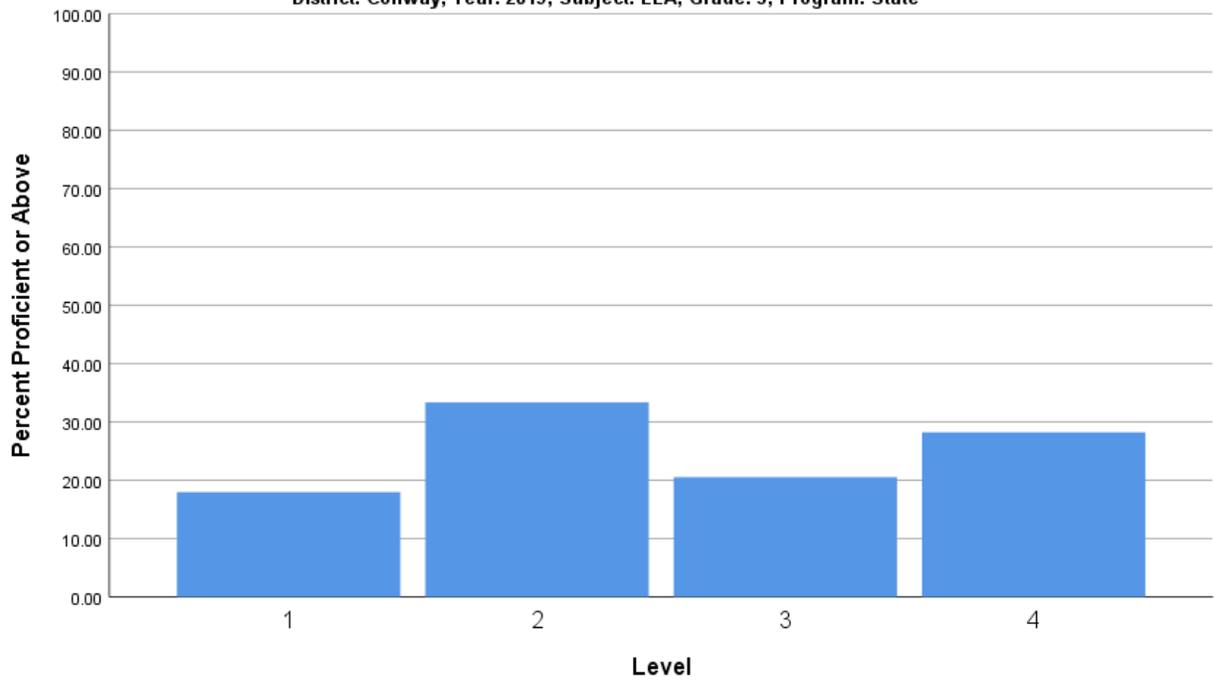
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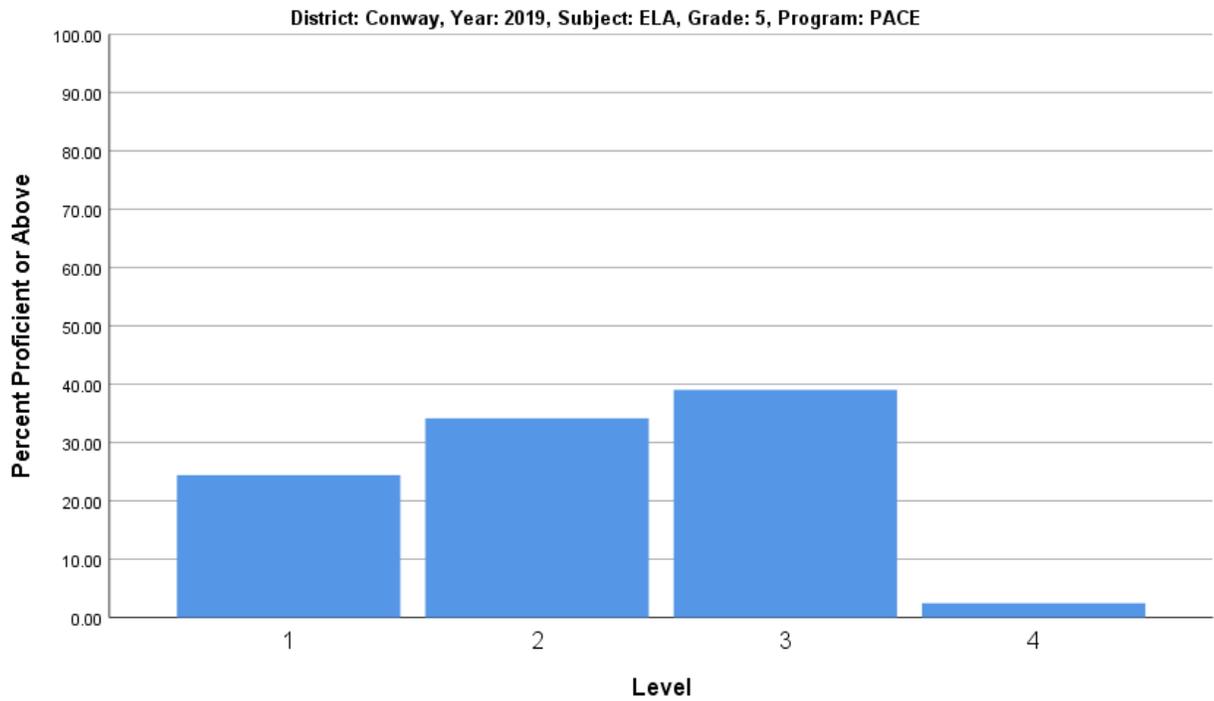
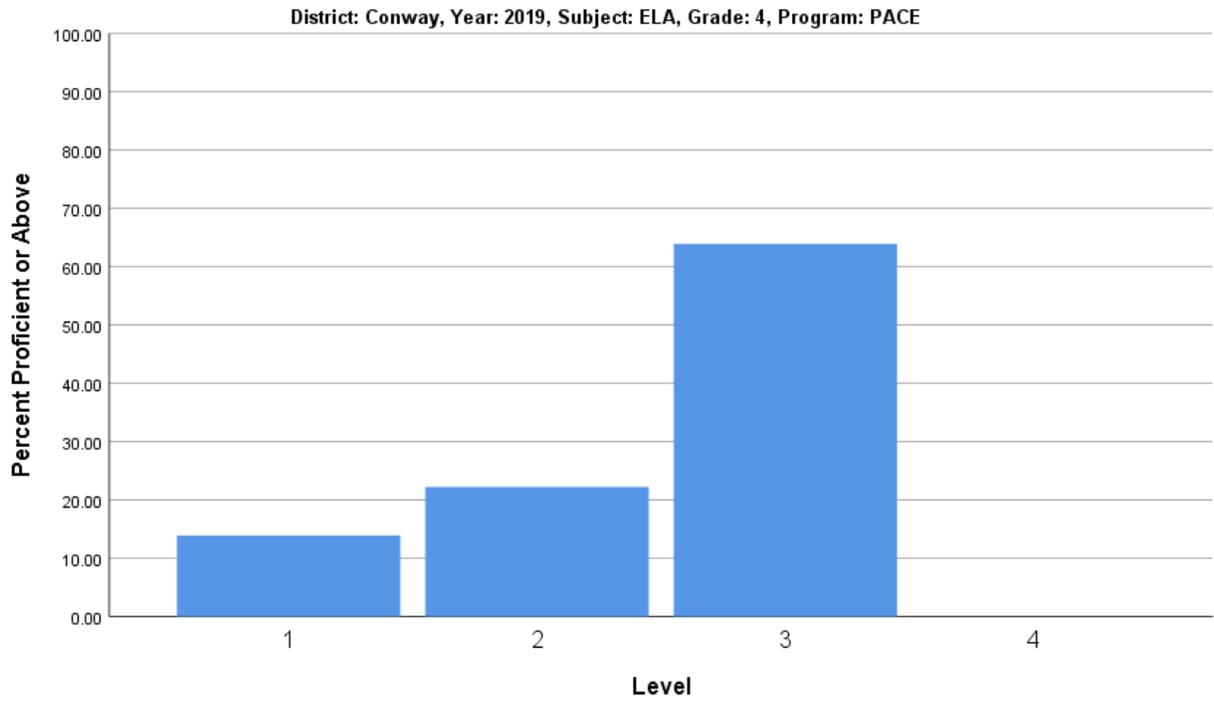


District: Concord, Year: 2019, Subject: Science, Grade: 8, Program: PACE

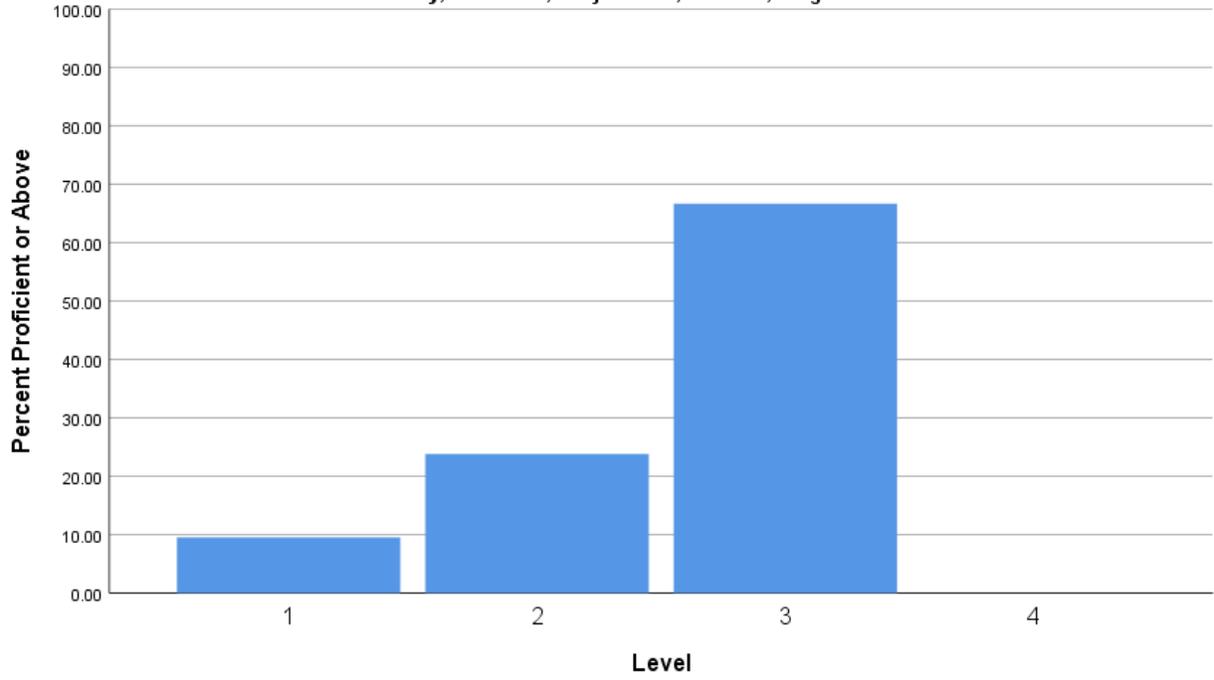


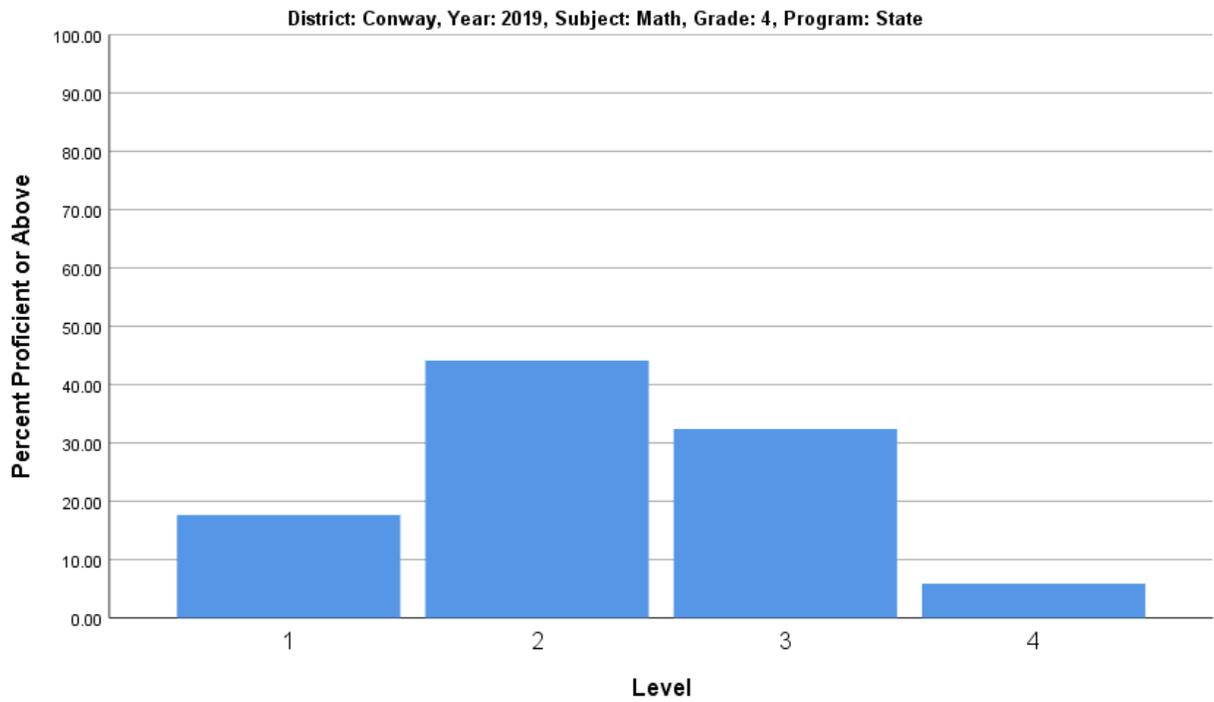
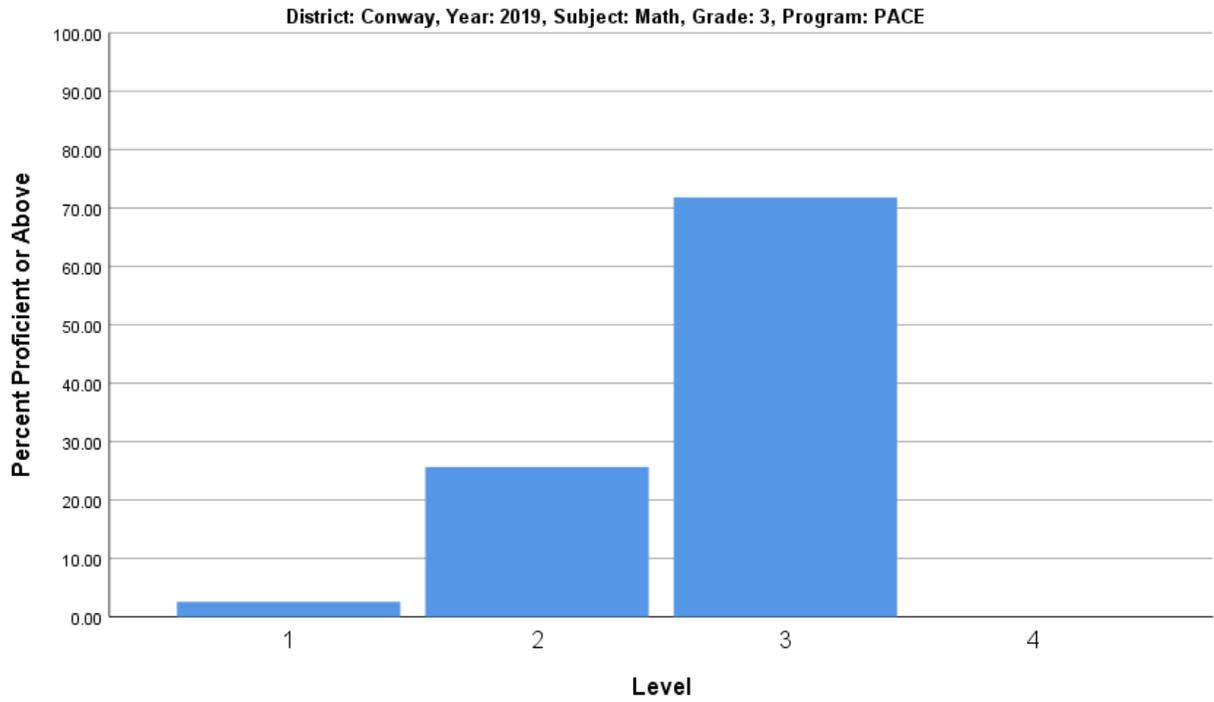
District: Conway, Year: 2019, Subject: ELA, Grade: 3, Program: State

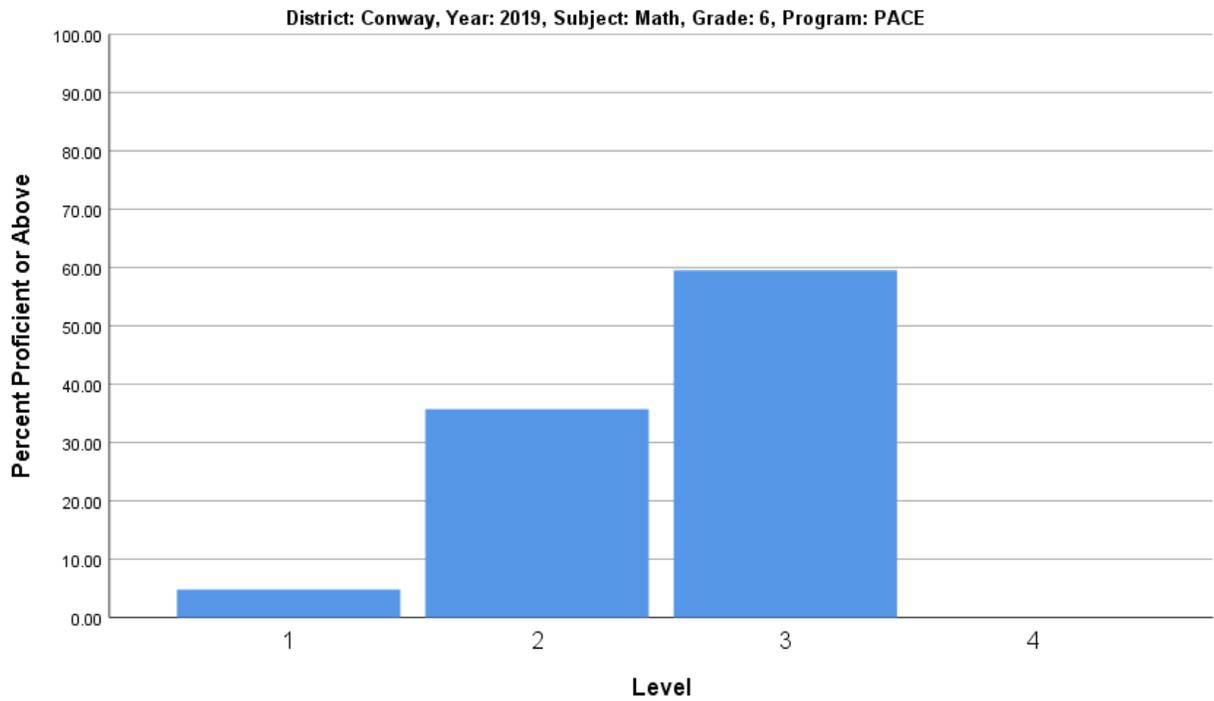
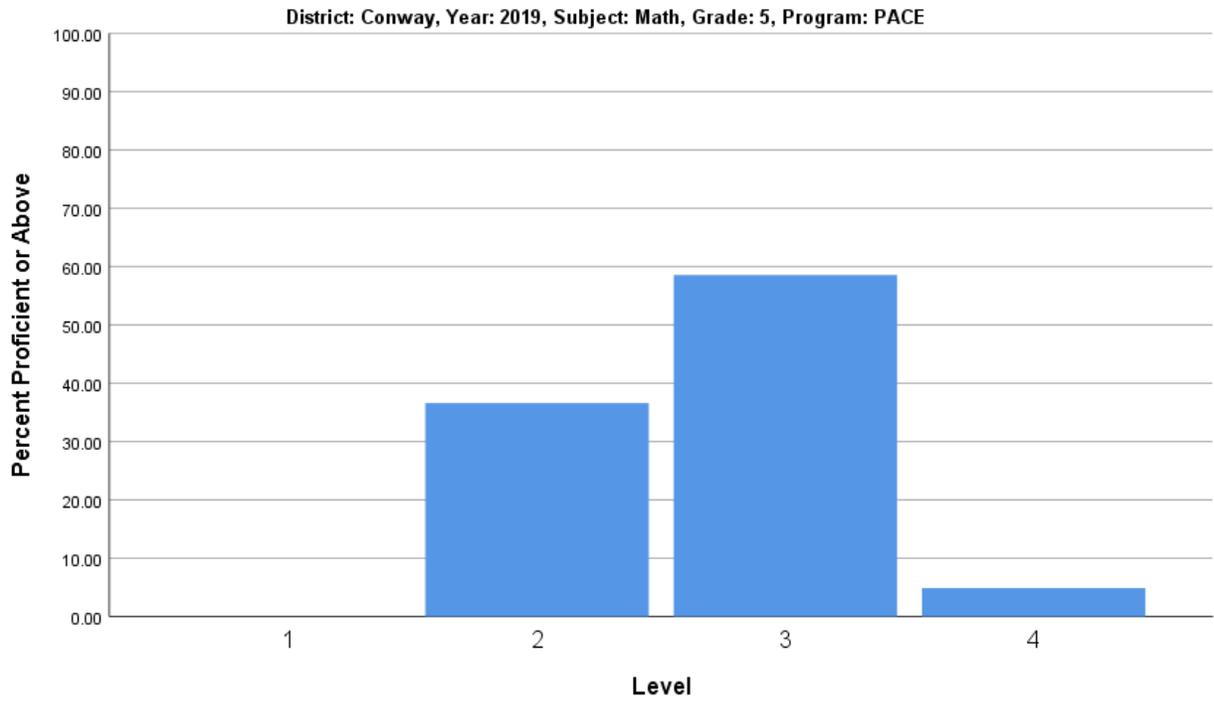




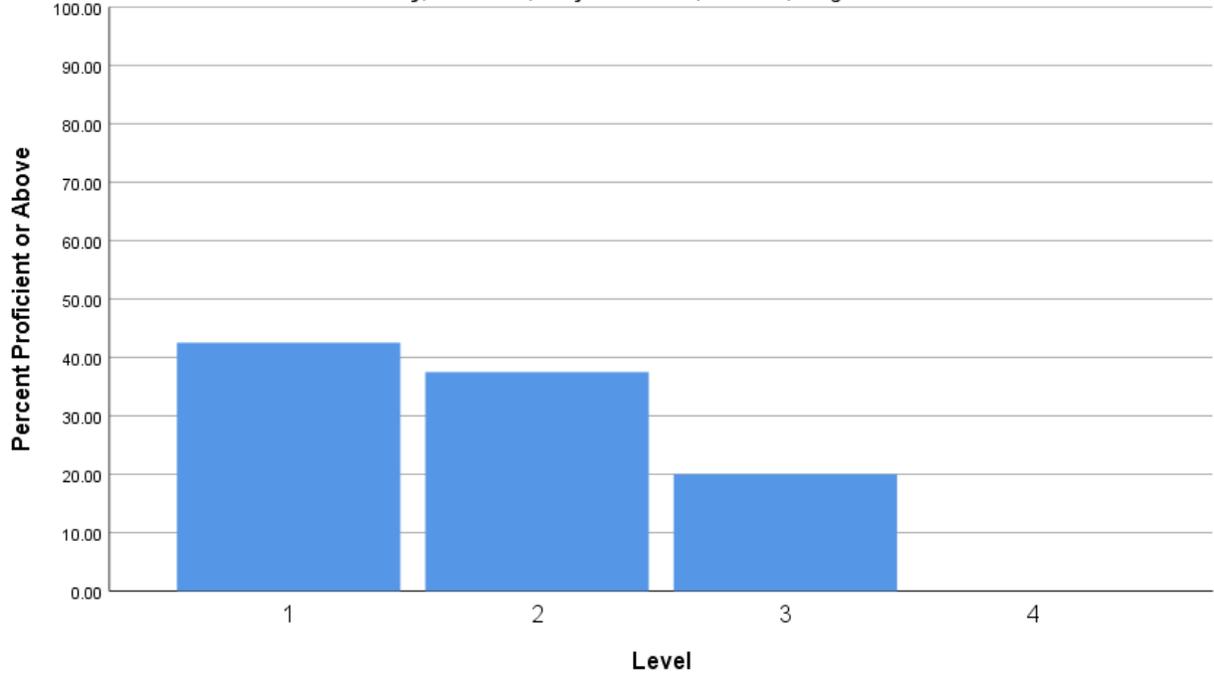
District: Conway, Year: 2019, Subject: ELA, Grade: 6, Program: PACE

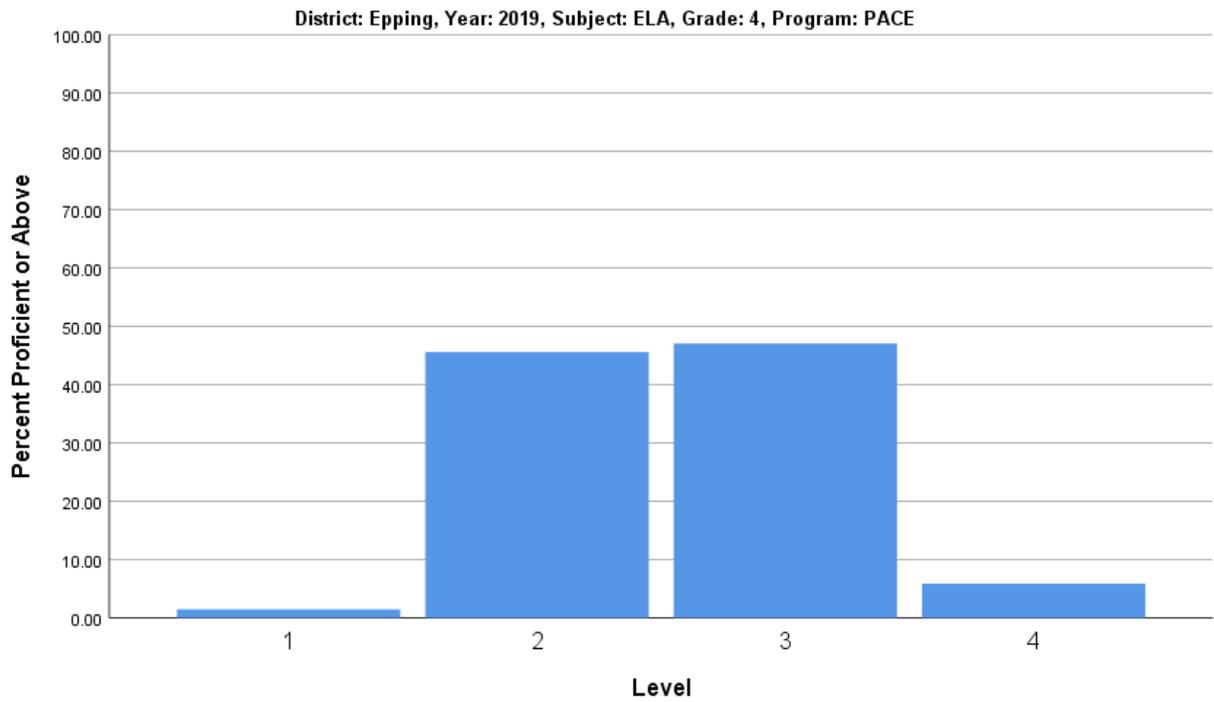
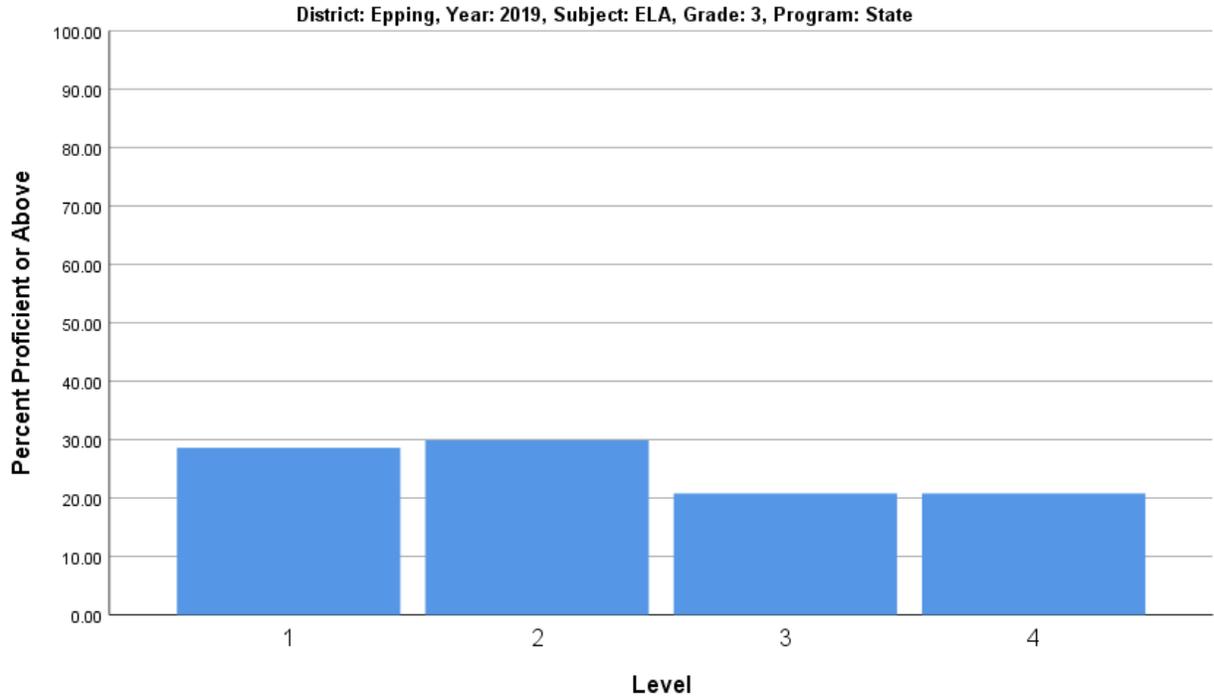


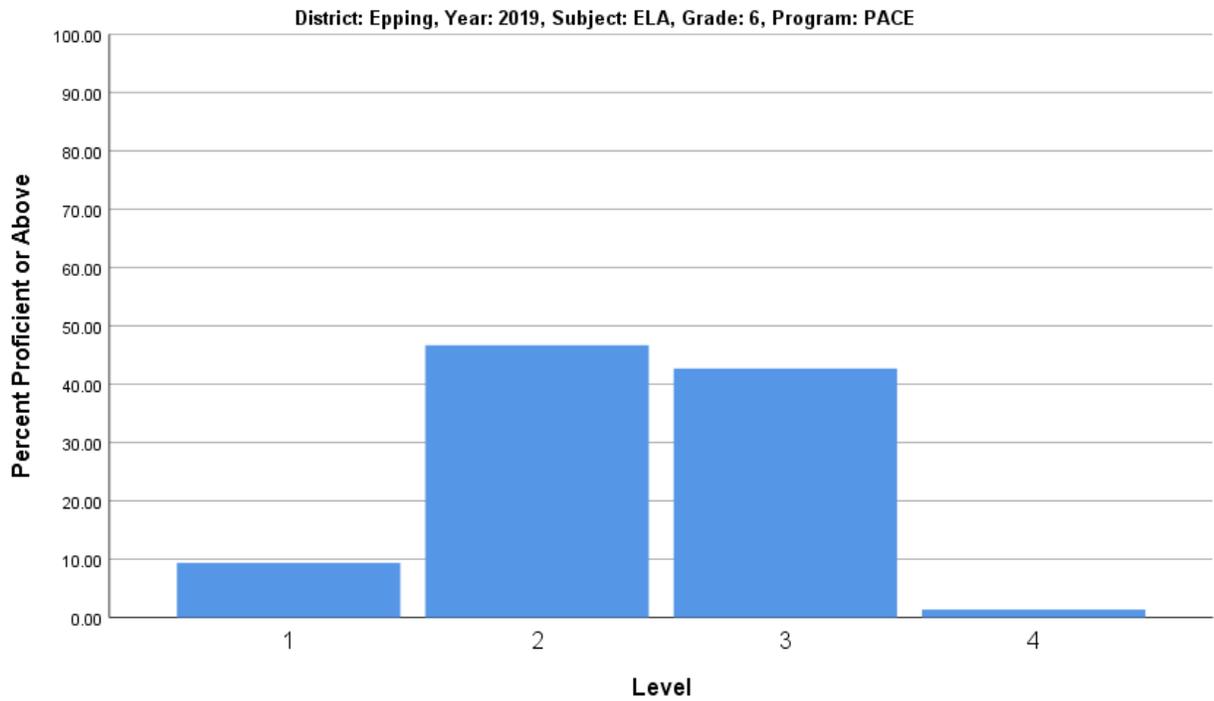
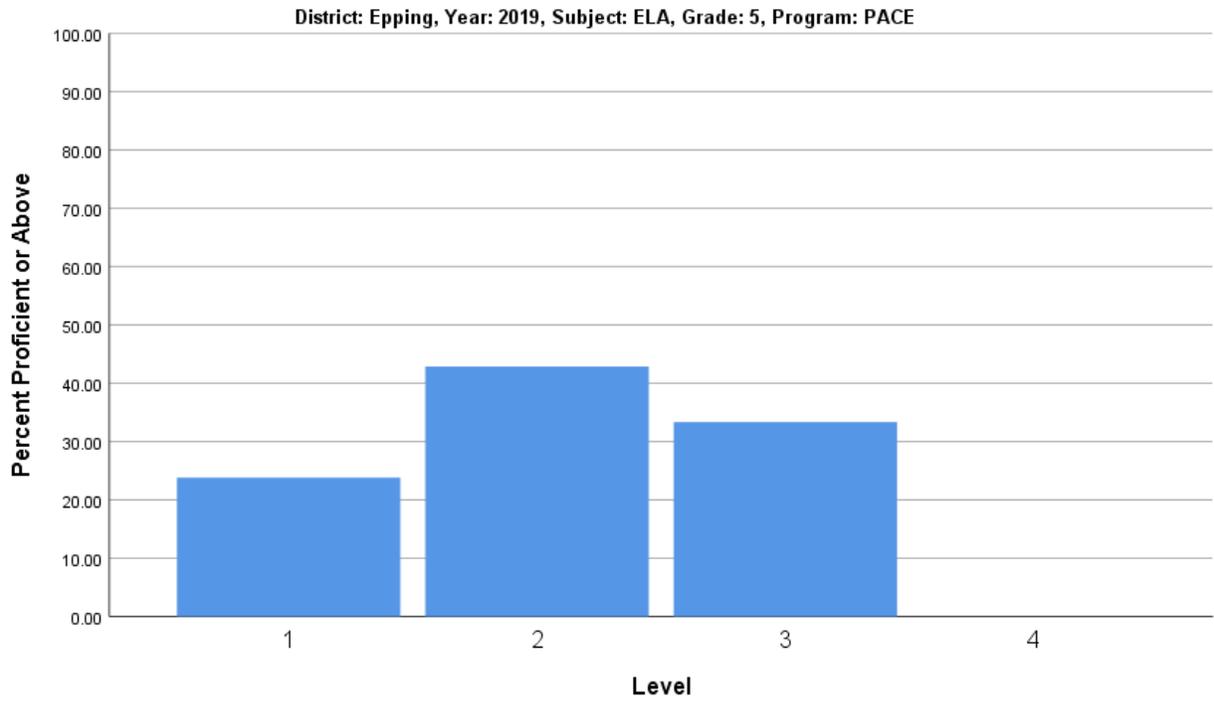




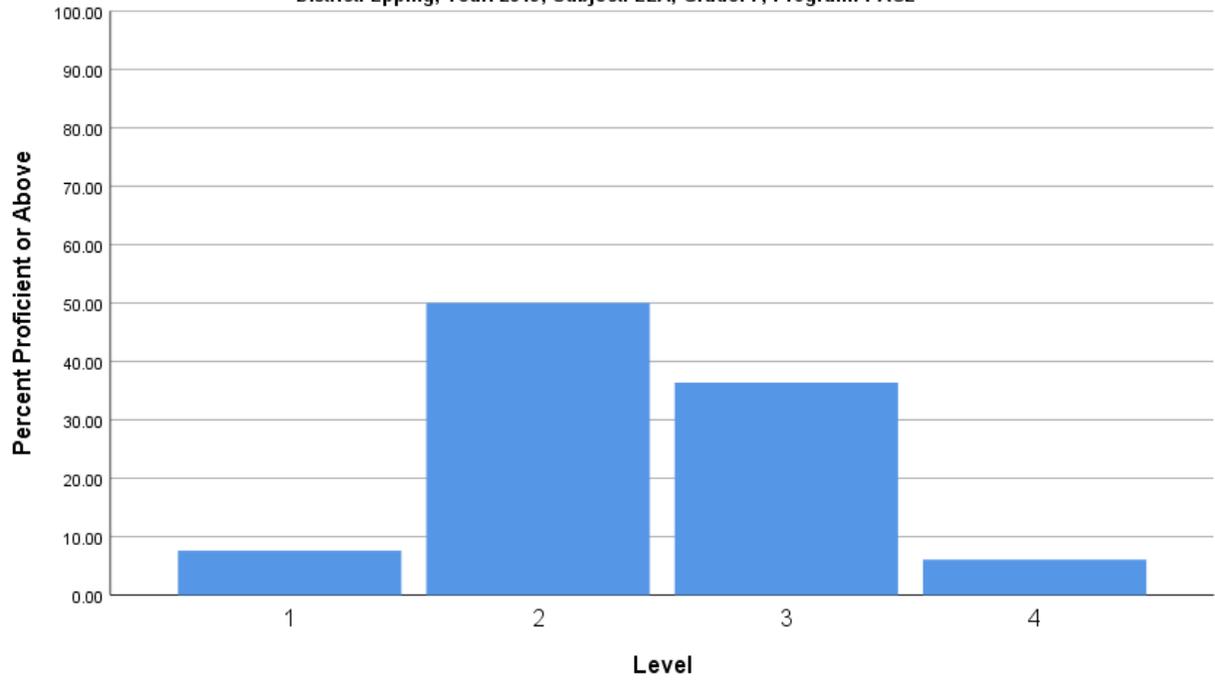
District: Conway, Year: 2019, Subject: Science, Grade: 5, Program: State

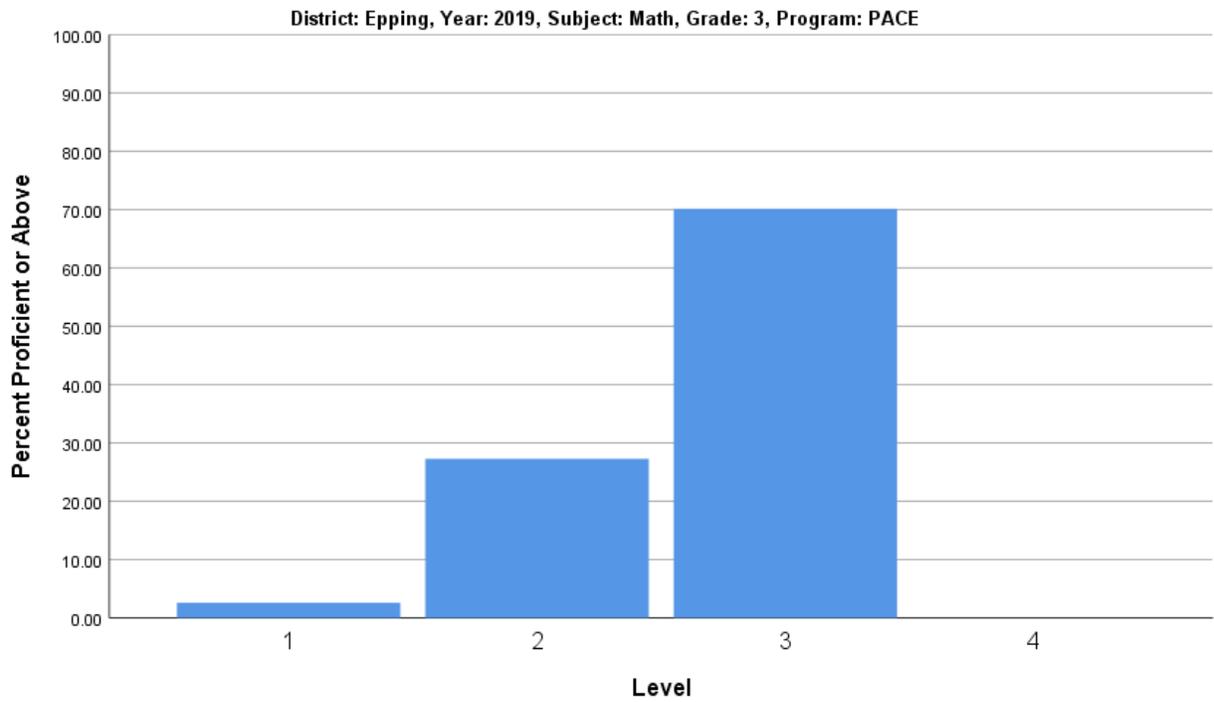
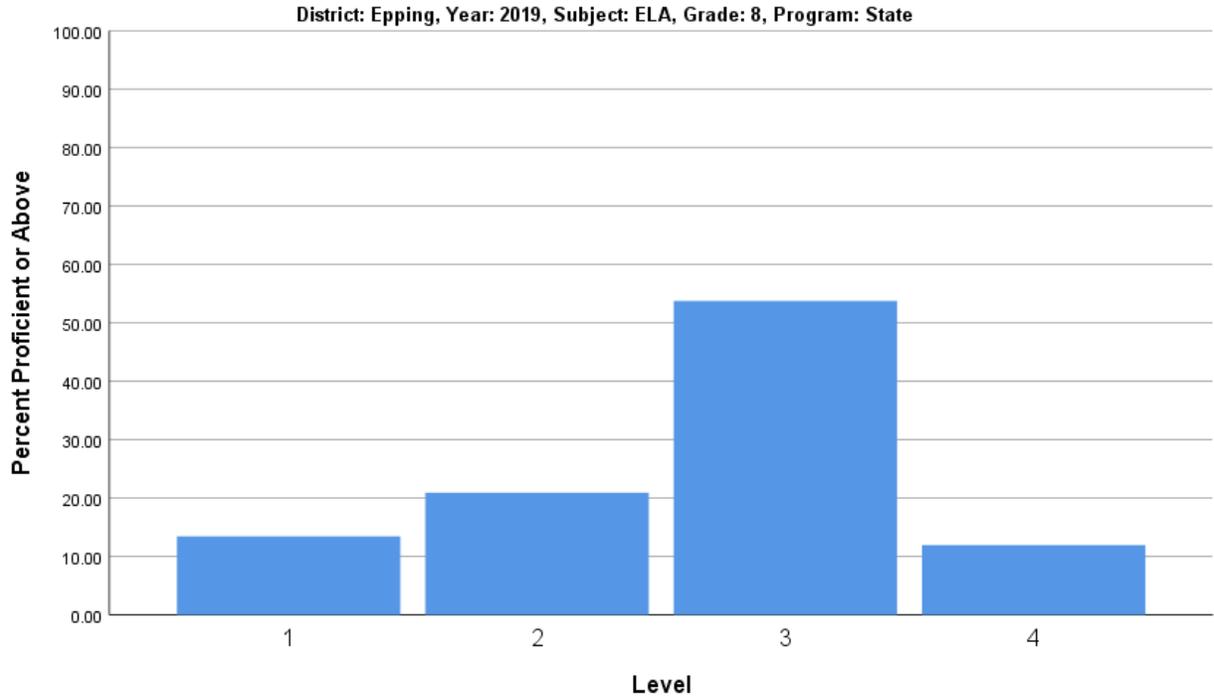


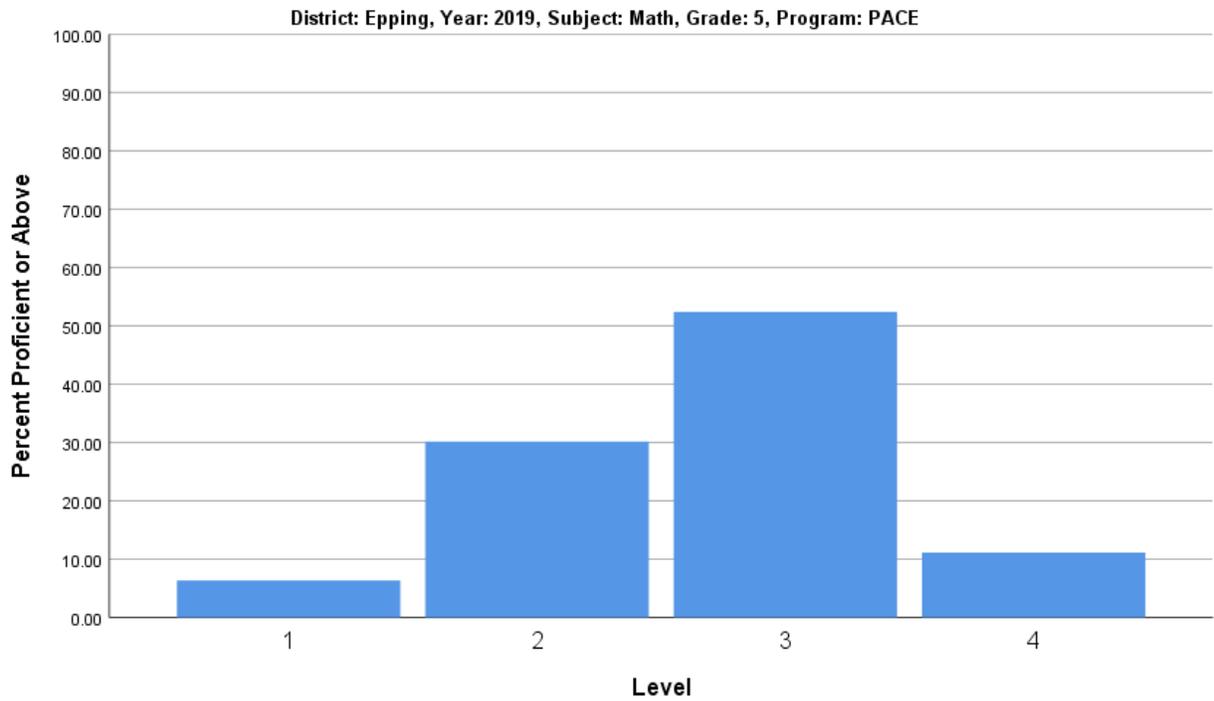
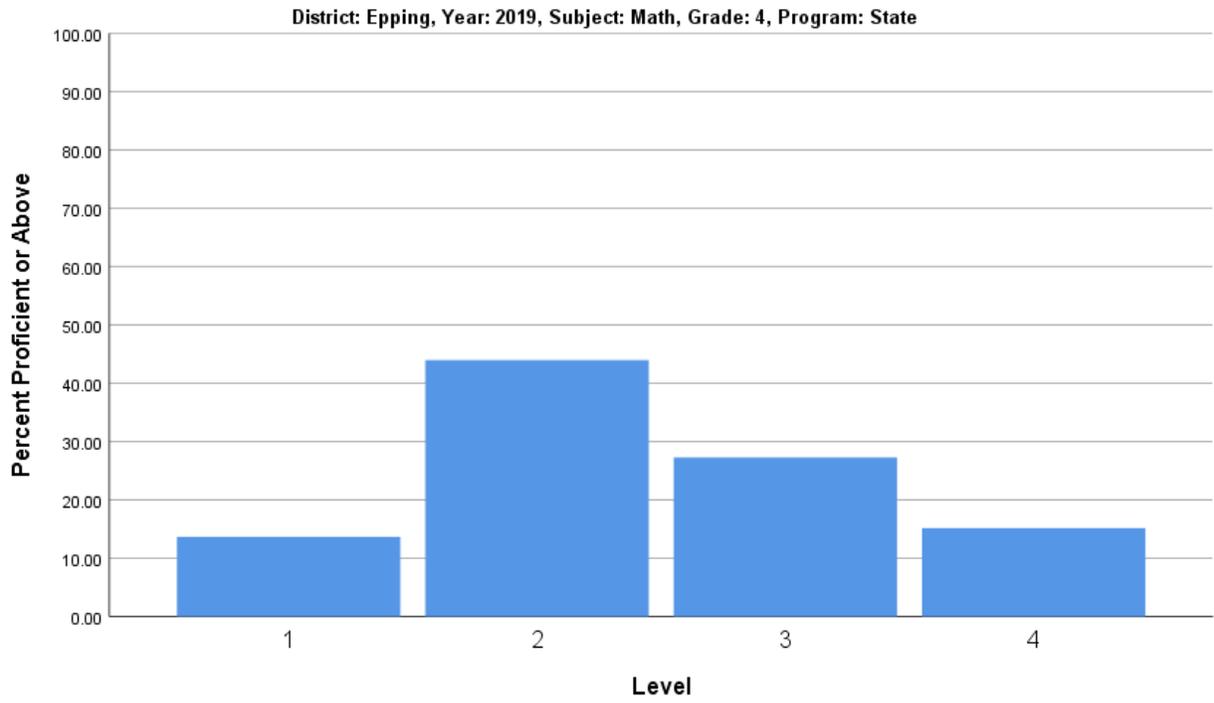




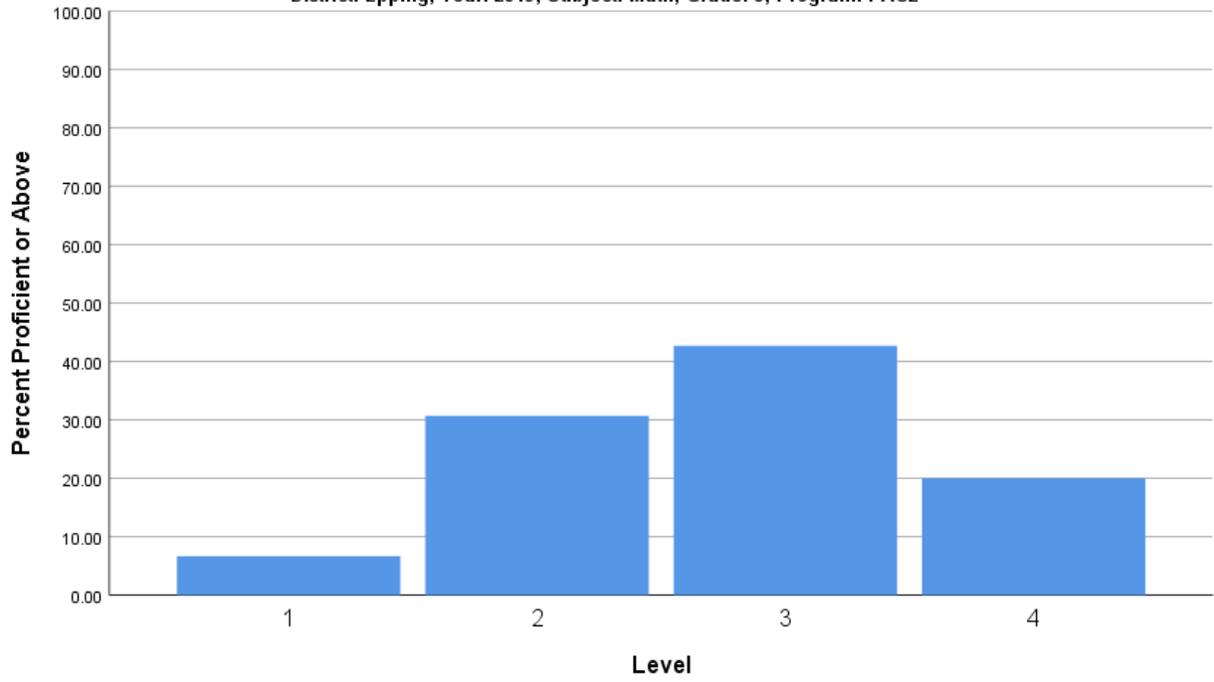
District: Epping, Year: 2019, Subject: ELA, Grade: 7, Program: PACE

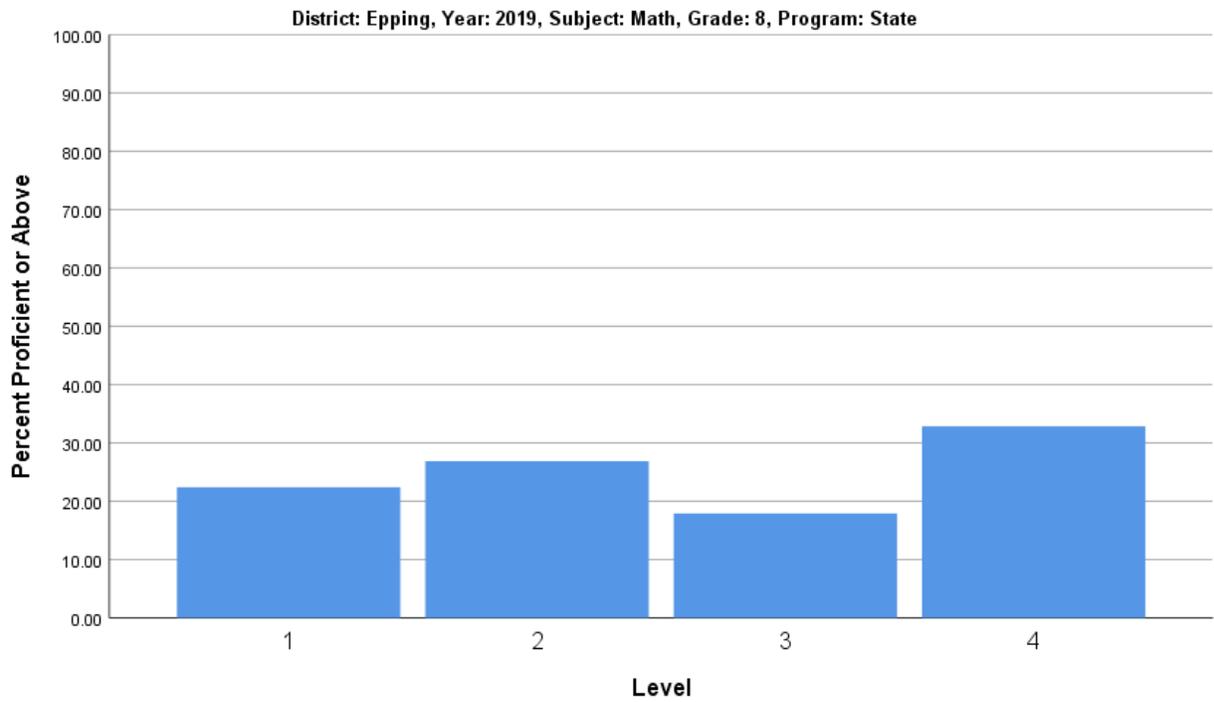
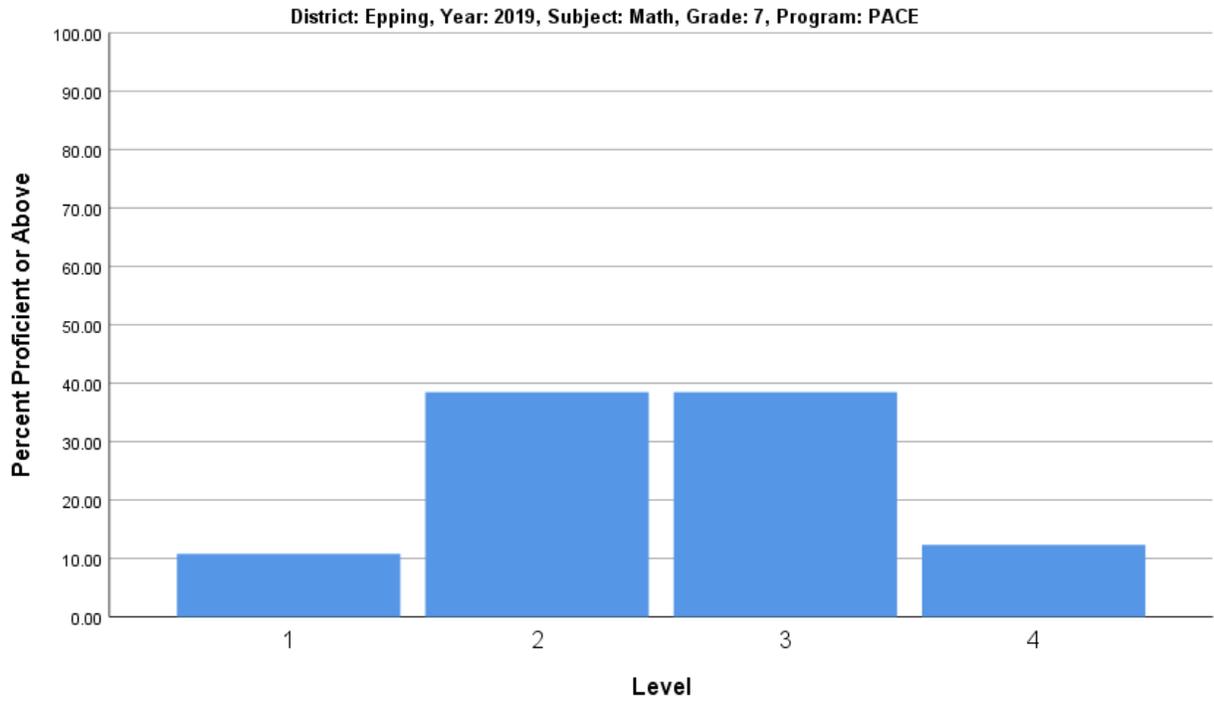


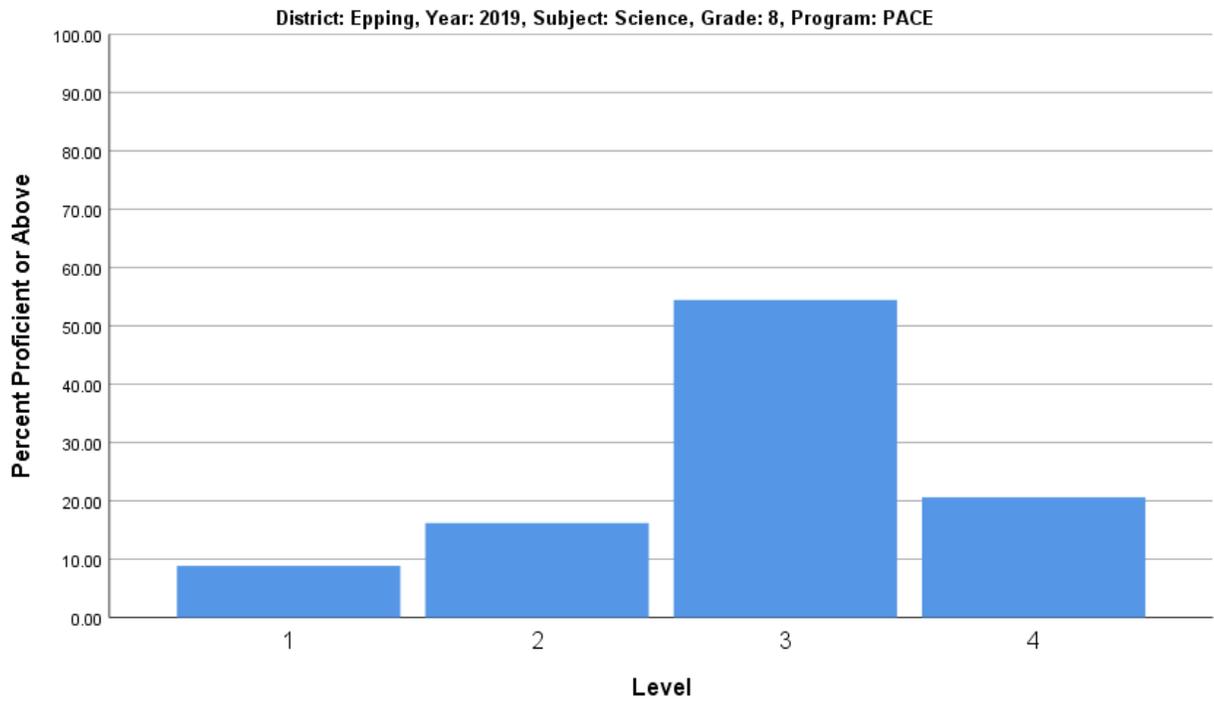
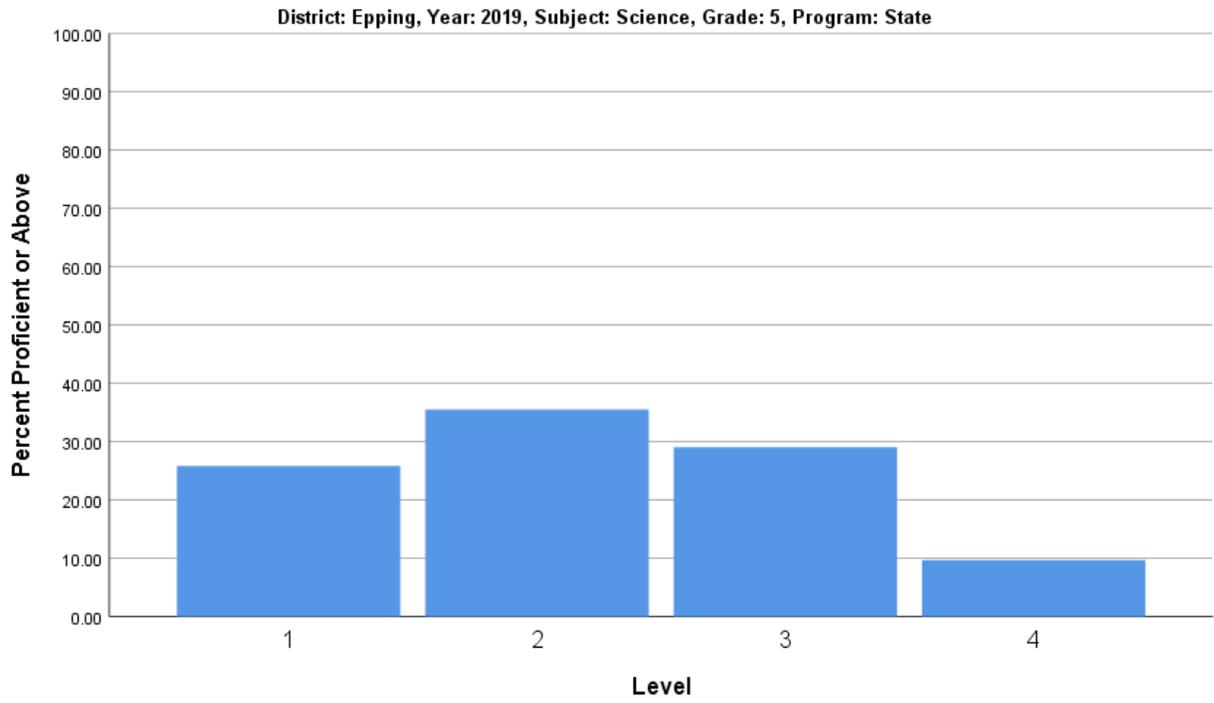




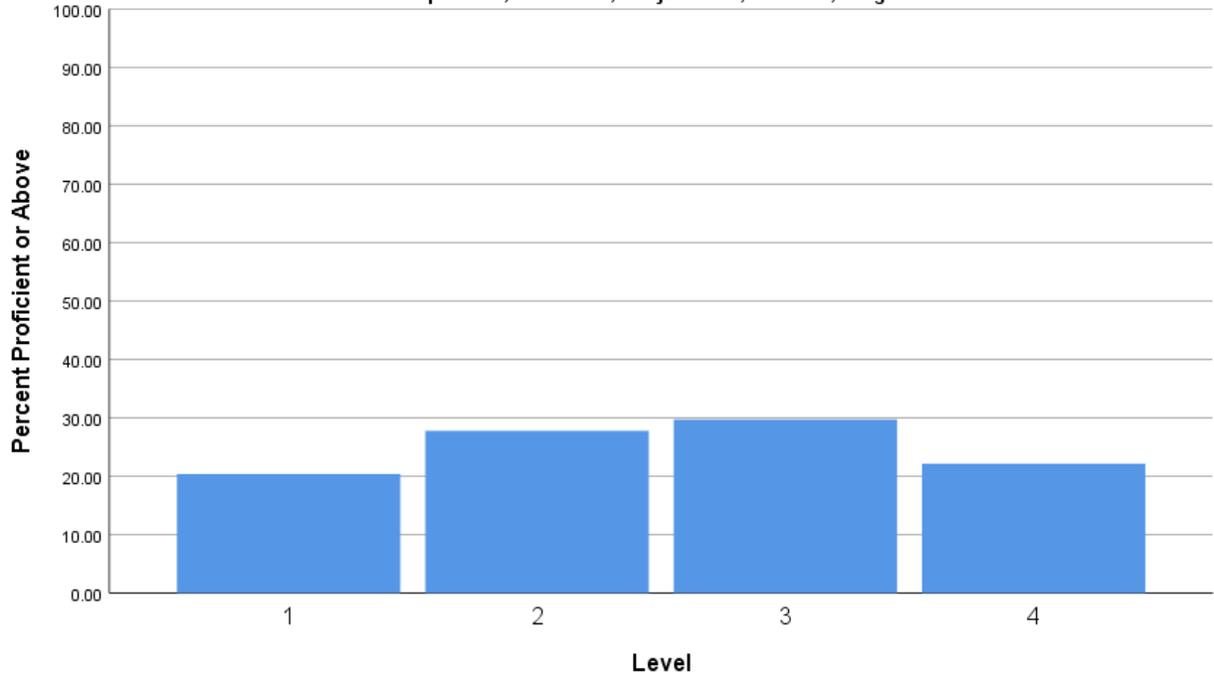
District: Epping, Year: 2019, Subject: Math, Grade: 6, Program: PACE



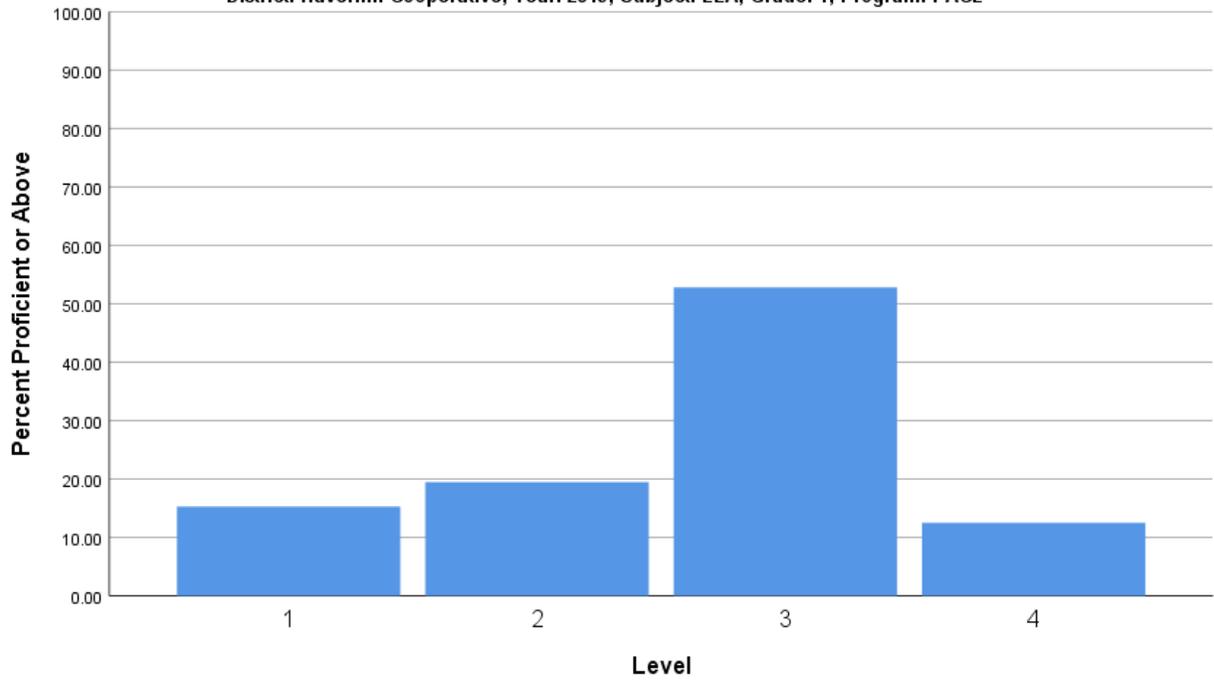




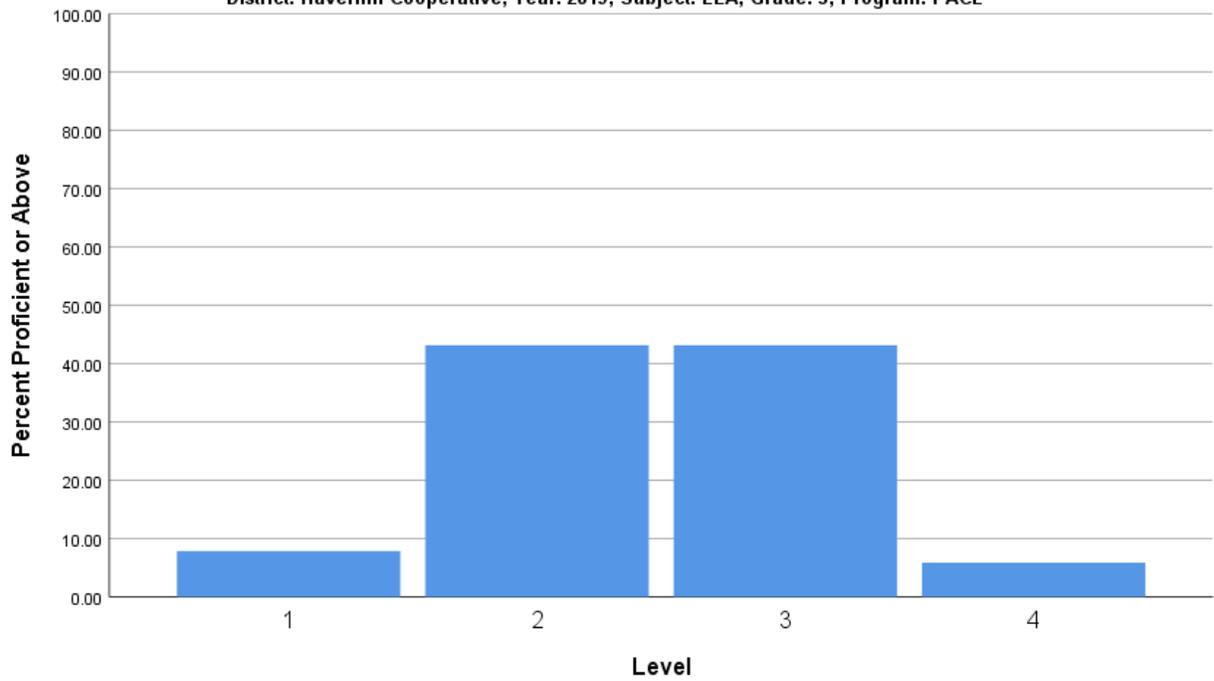
District: Haverhill Cooperative, Year: 2019, Subject: ELA, Grade: 3, Program: State



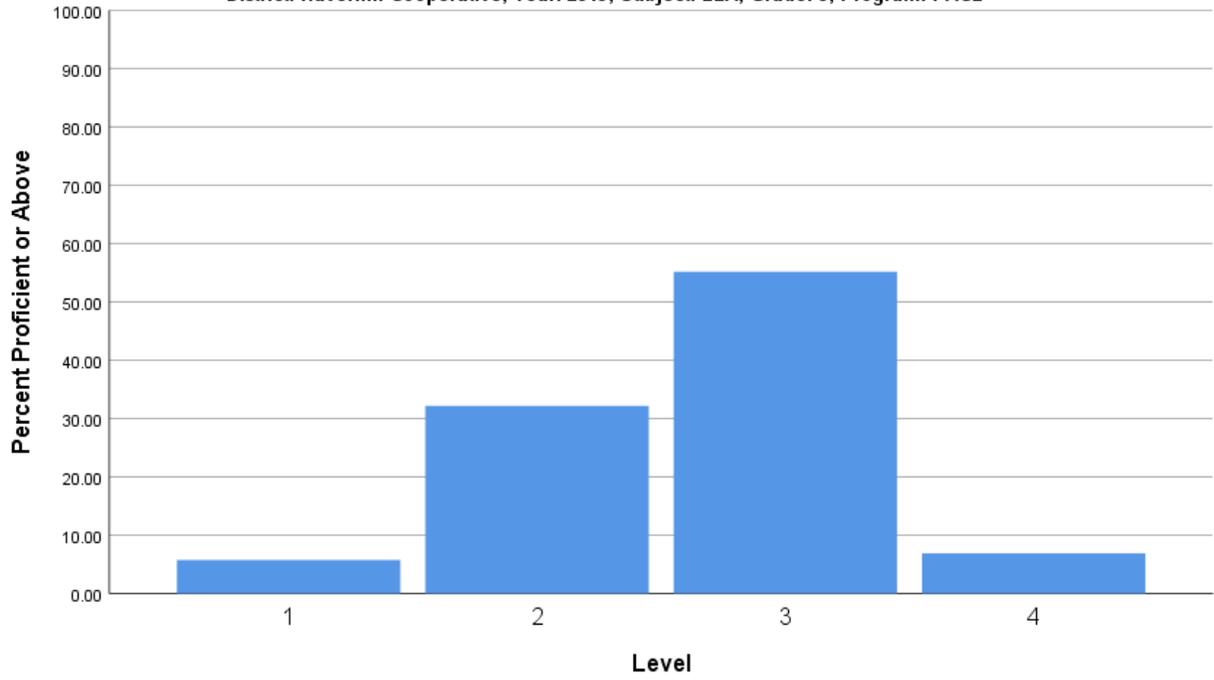
District: Haverhill Cooperative, Year: 2019, Subject: ELA, Grade: 4, Program: PACE



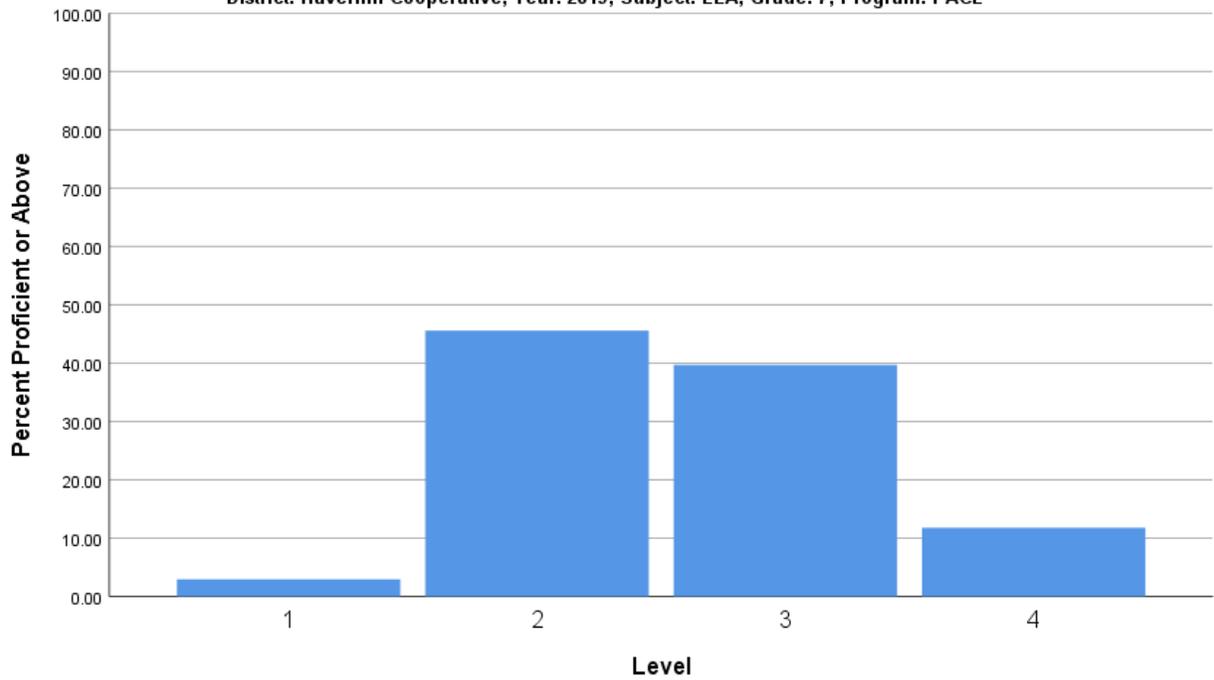
District: Haverhill Cooperative, Year: 2019, Subject: ELA, Grade: 5, Program: PACE



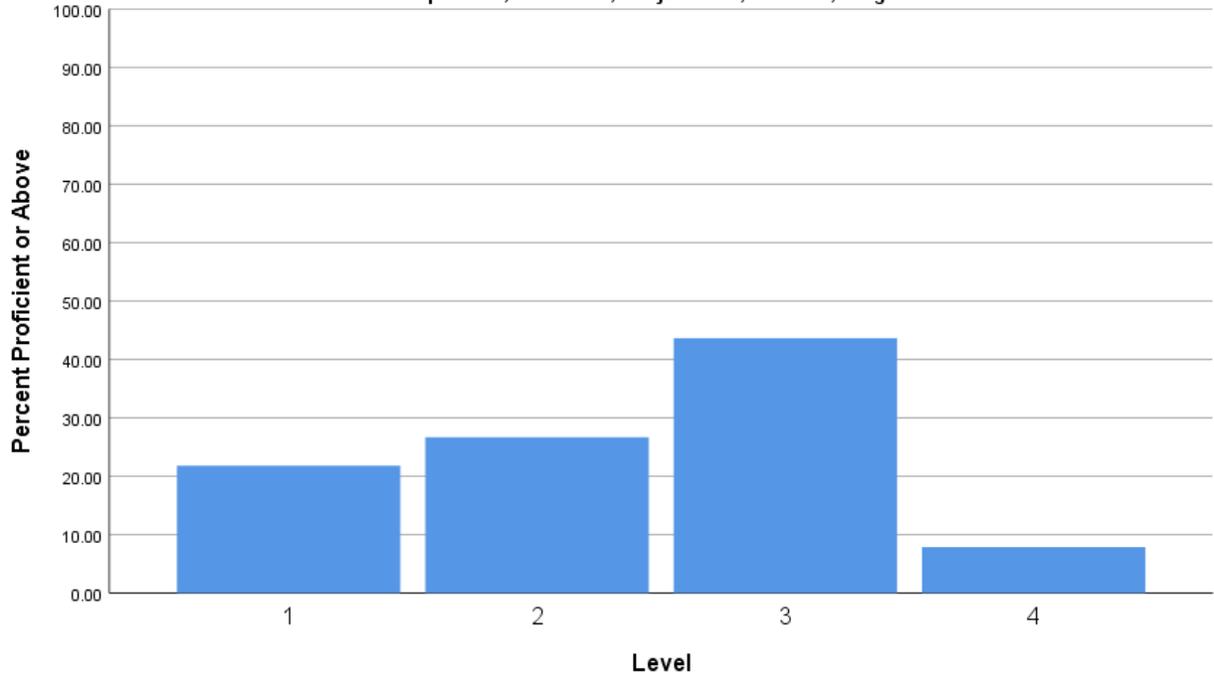
District: Haverhill Cooperative, Year: 2019, Subject: ELA, Grade: 6, Program: PACE



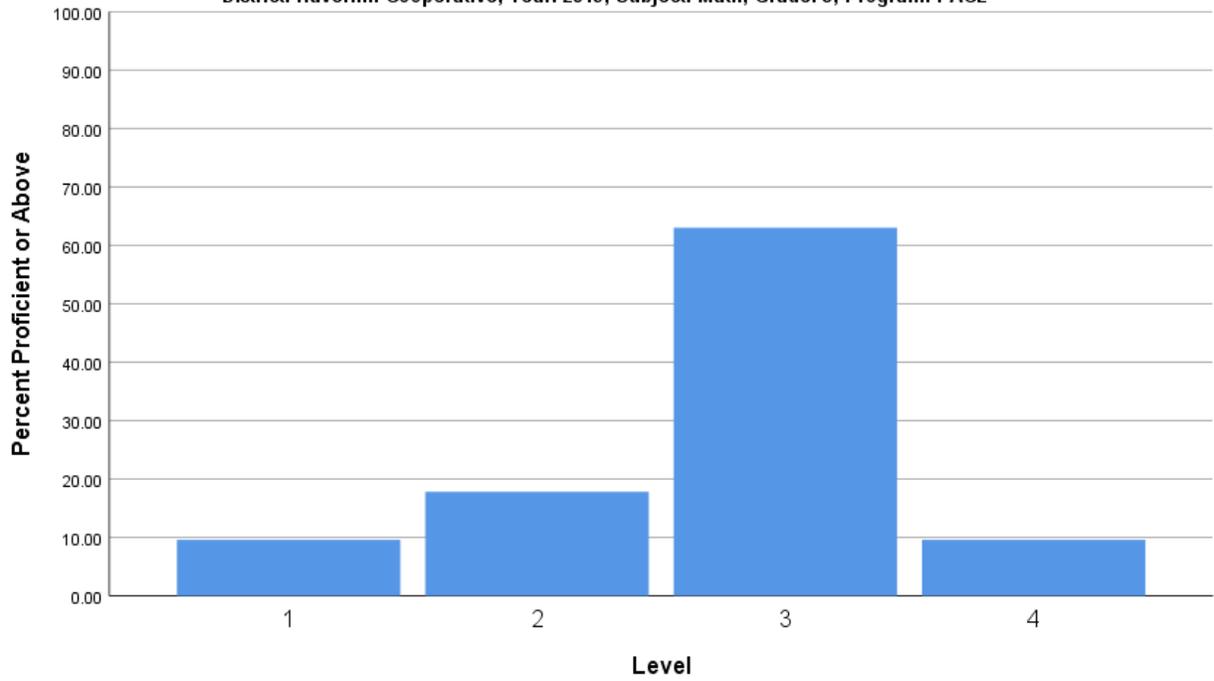
District: Haverhill Cooperative, Year: 2019, Subject: ELA, Grade: 7, Program: PACE



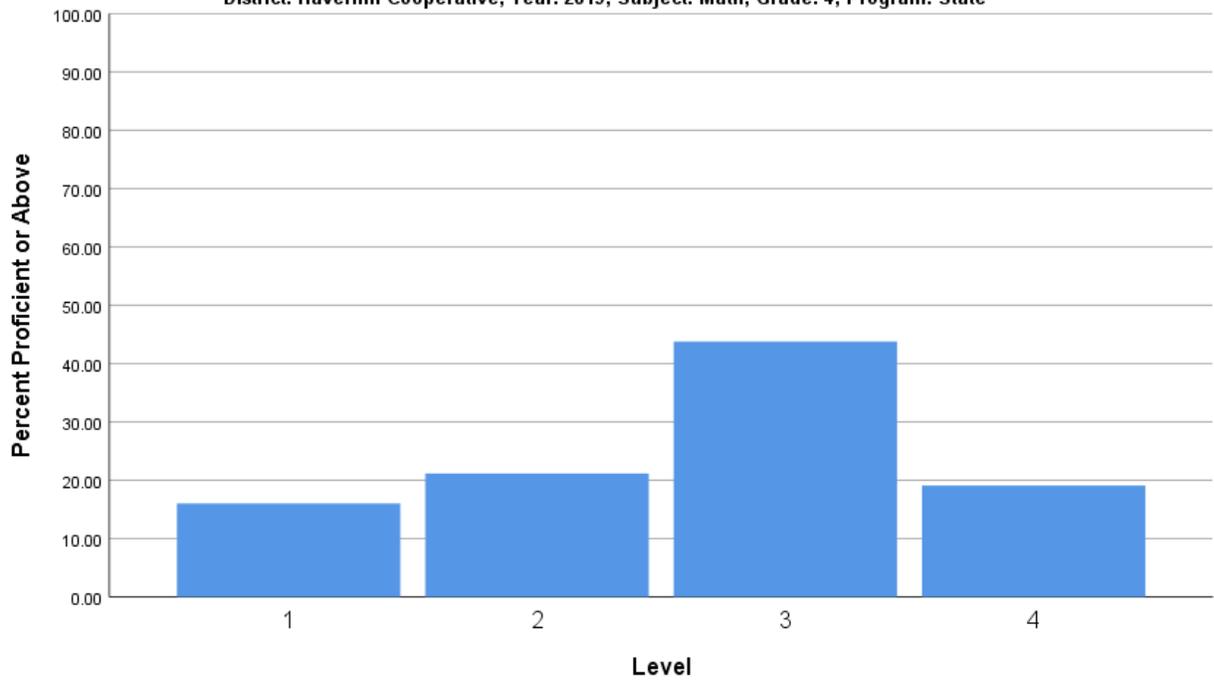
District: Haverhill Cooperative, Year: 2019, Subject: ELA, Grade: 8, Program: State



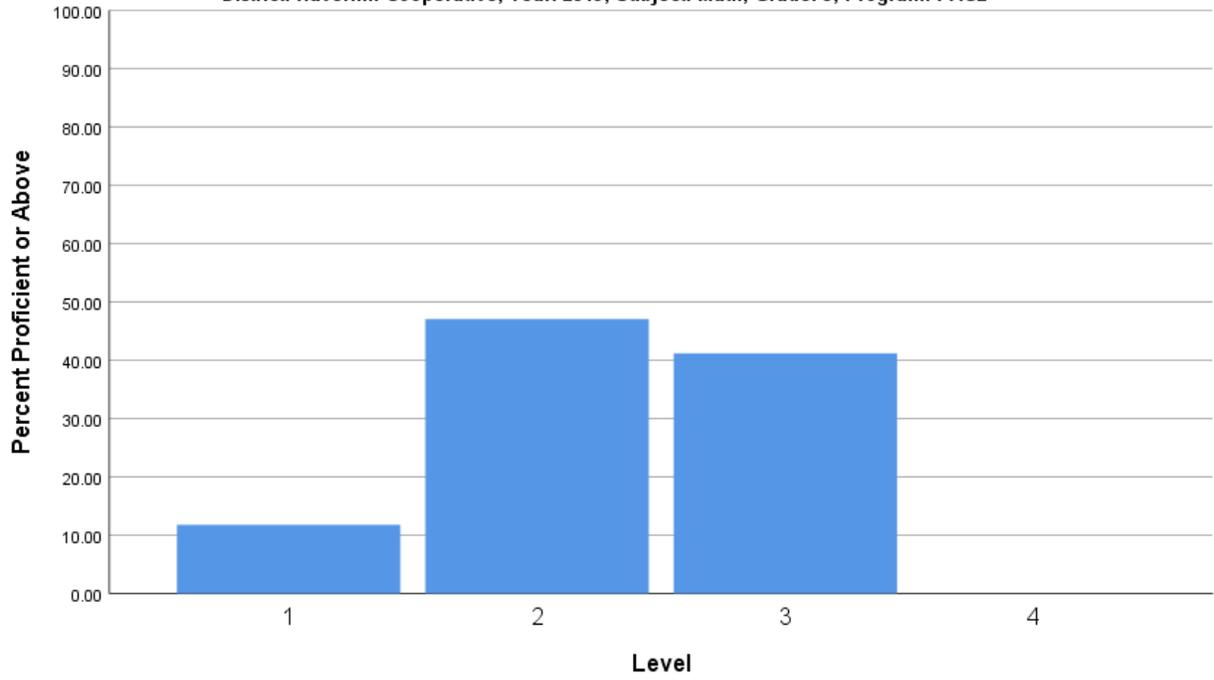
District: Haverhill Cooperative, Year: 2019, Subject: Math, Grade: 3, Program: PACE



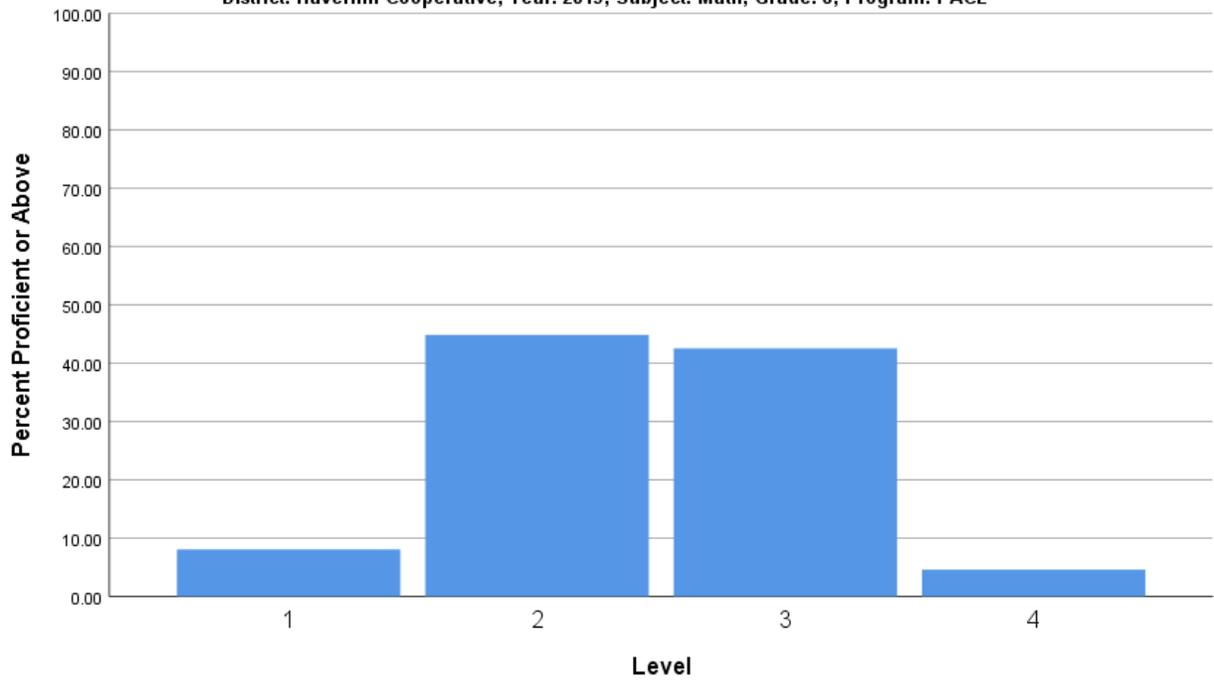
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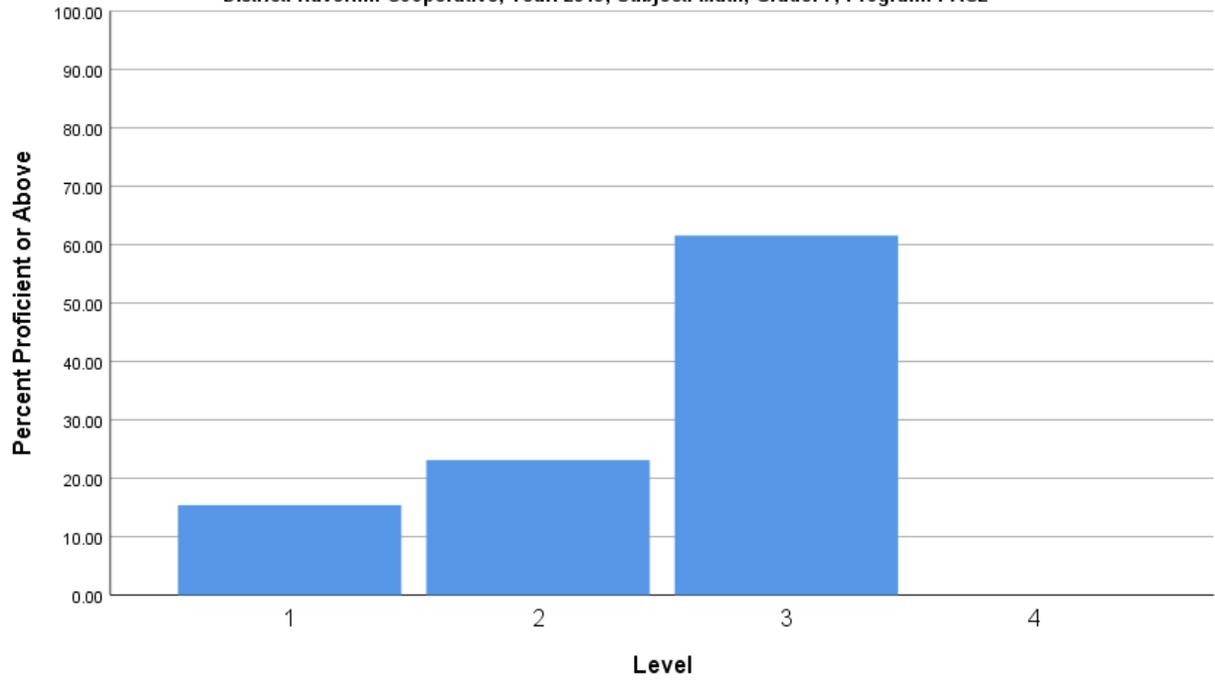
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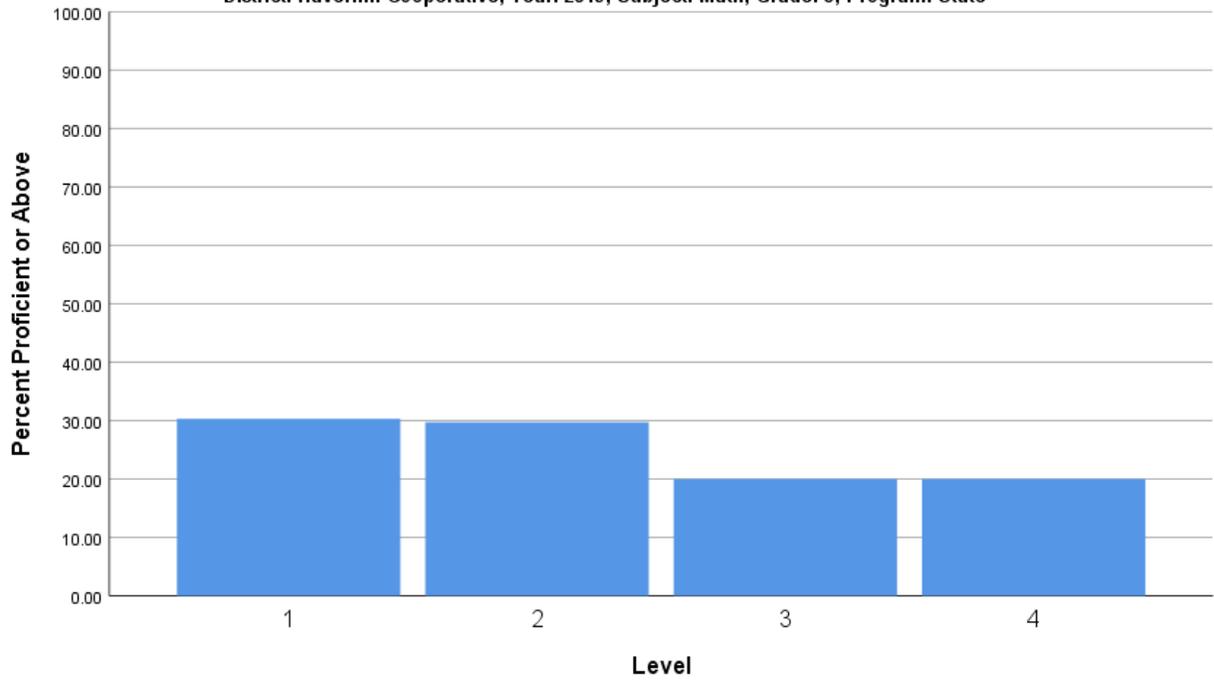
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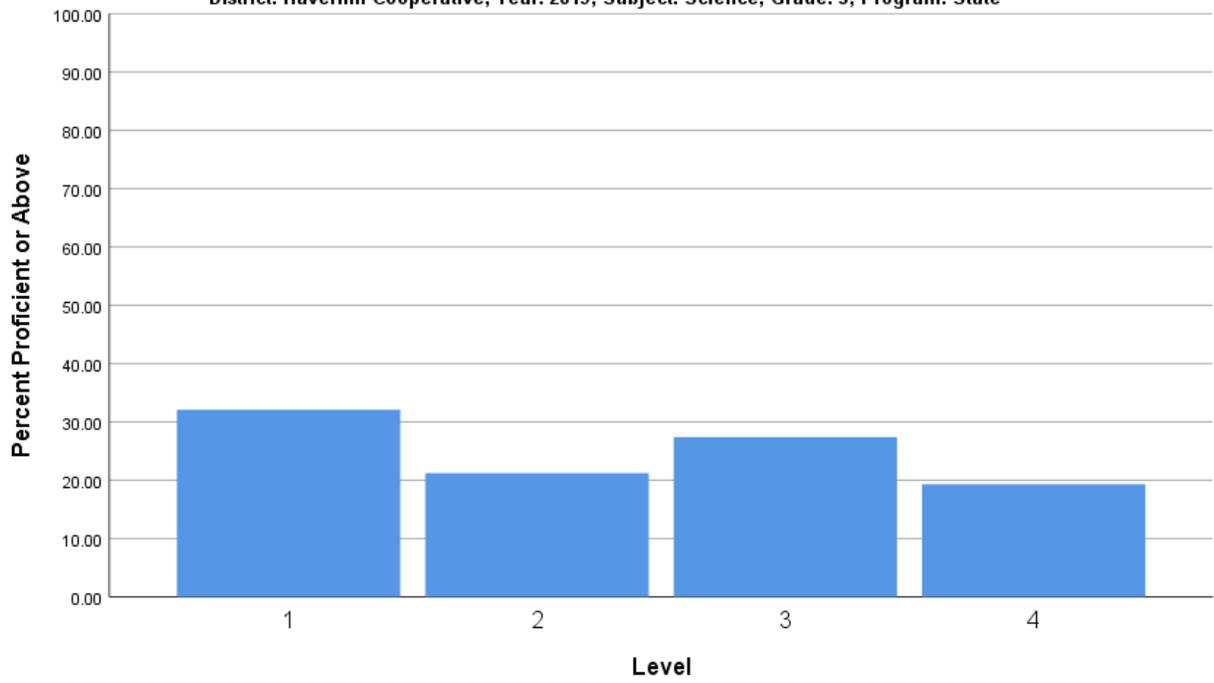
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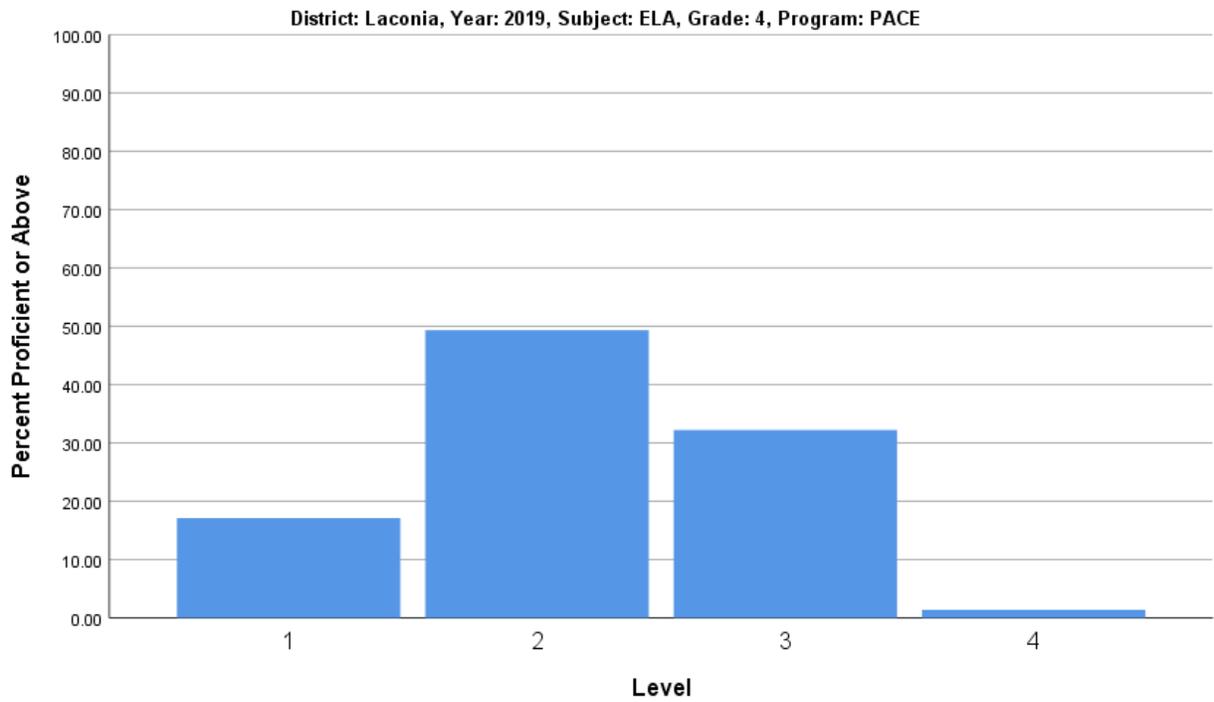
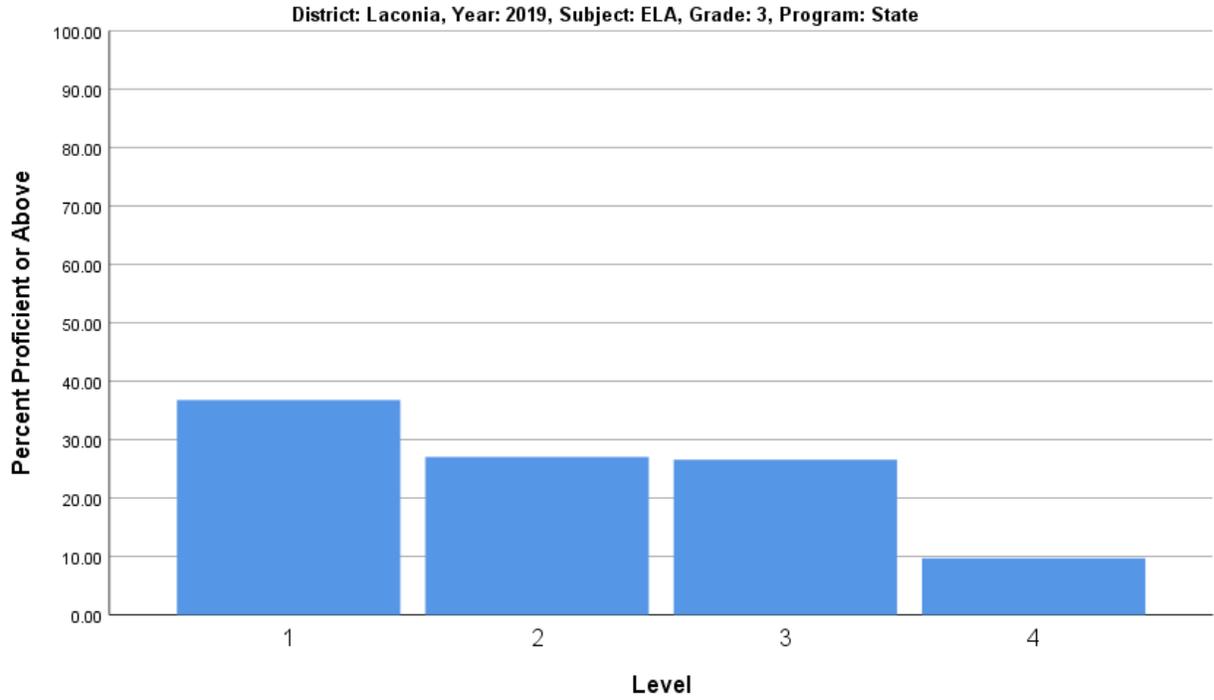


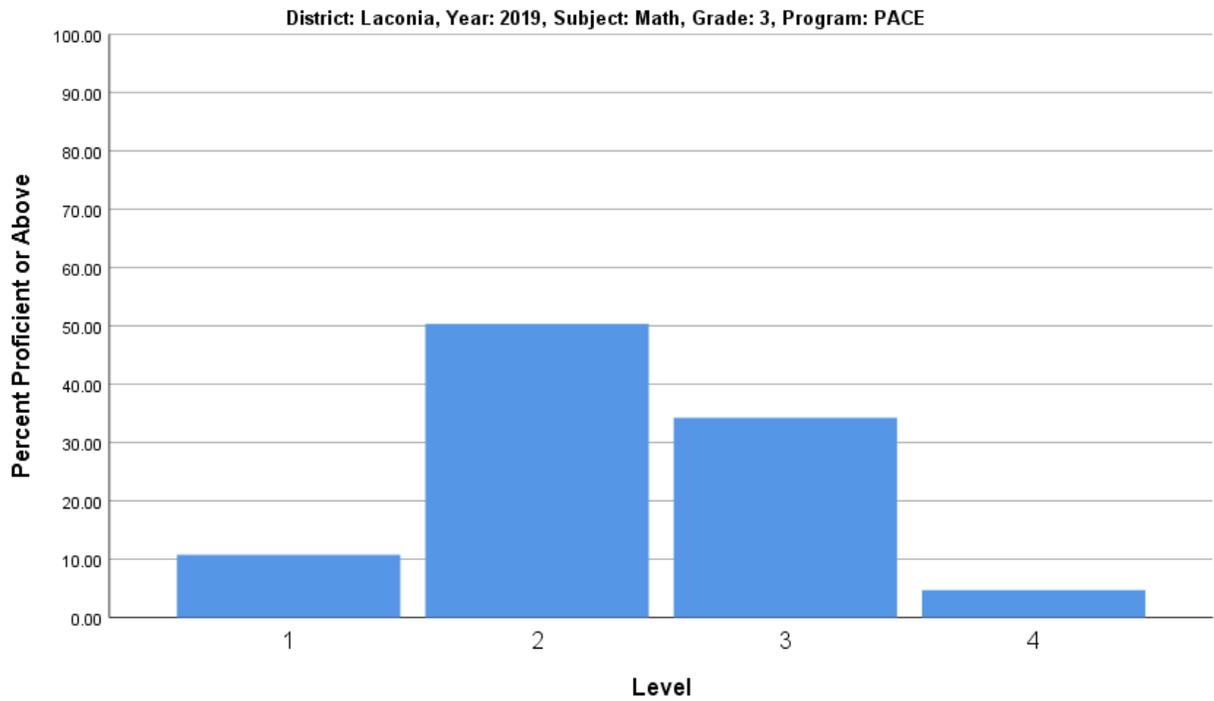
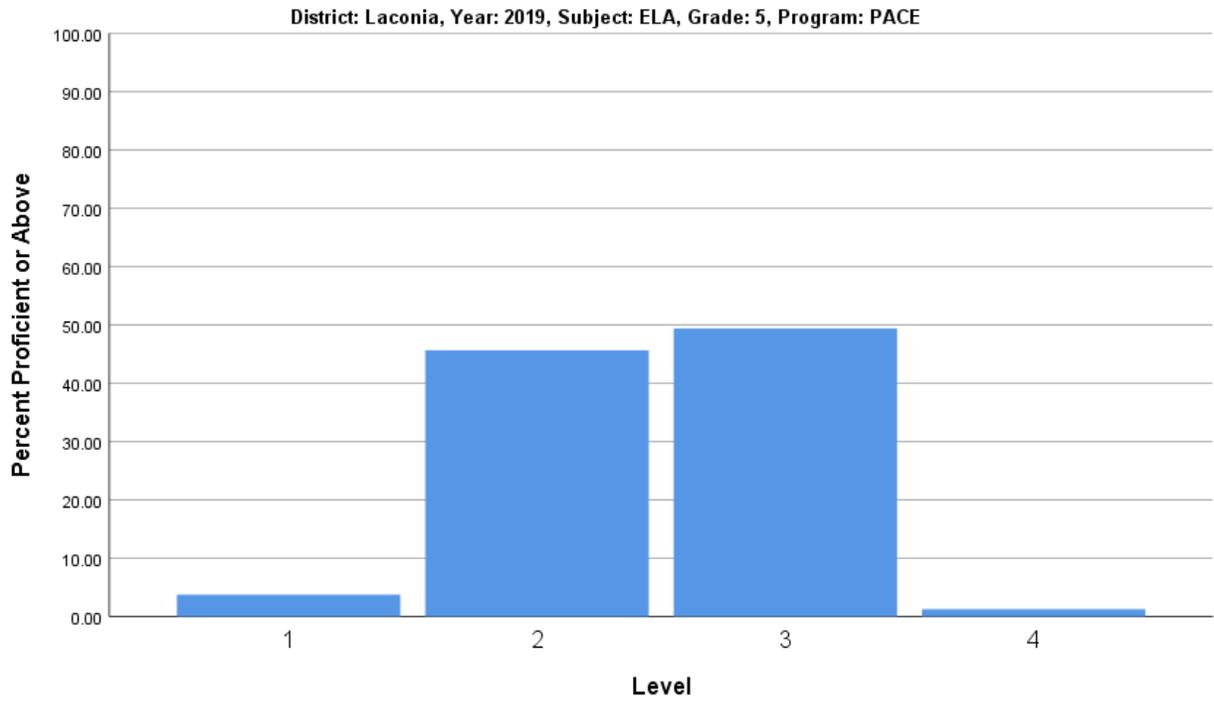
District: Haverhill Cooperative, Year: 2019, Subject: Math, Grade: 8, Program: State



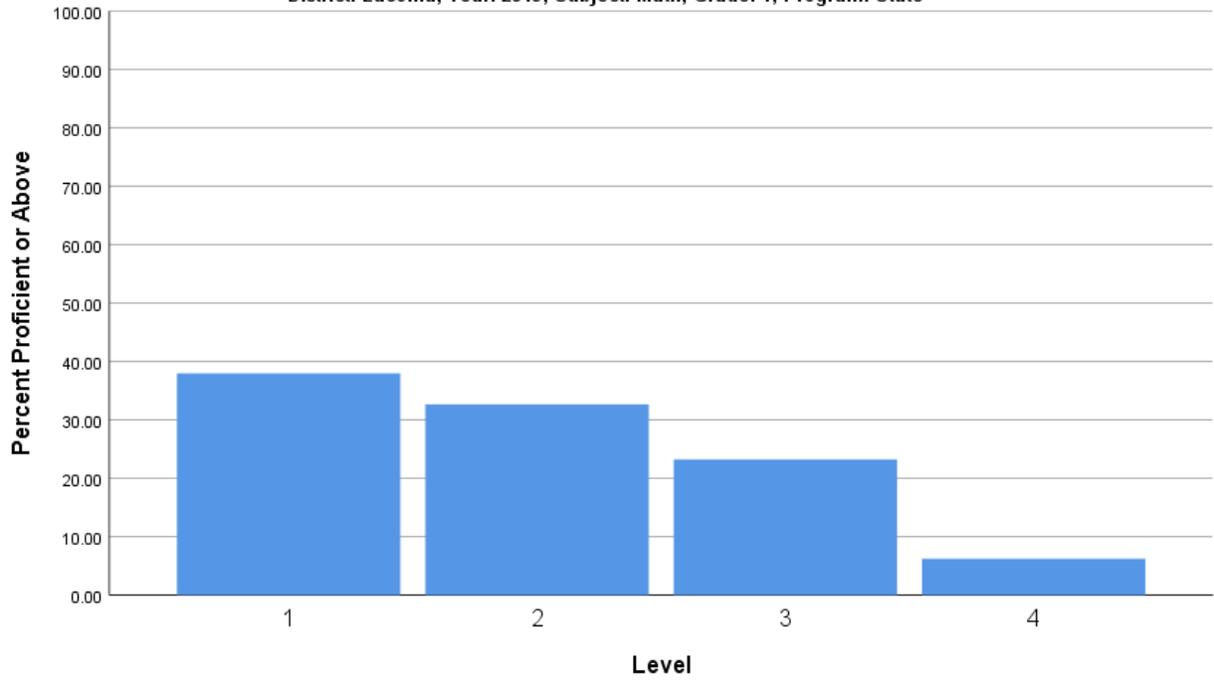
District: Haverhill Cooperative, Year: 2019, Subject: Science, Grade: 5, Program: State

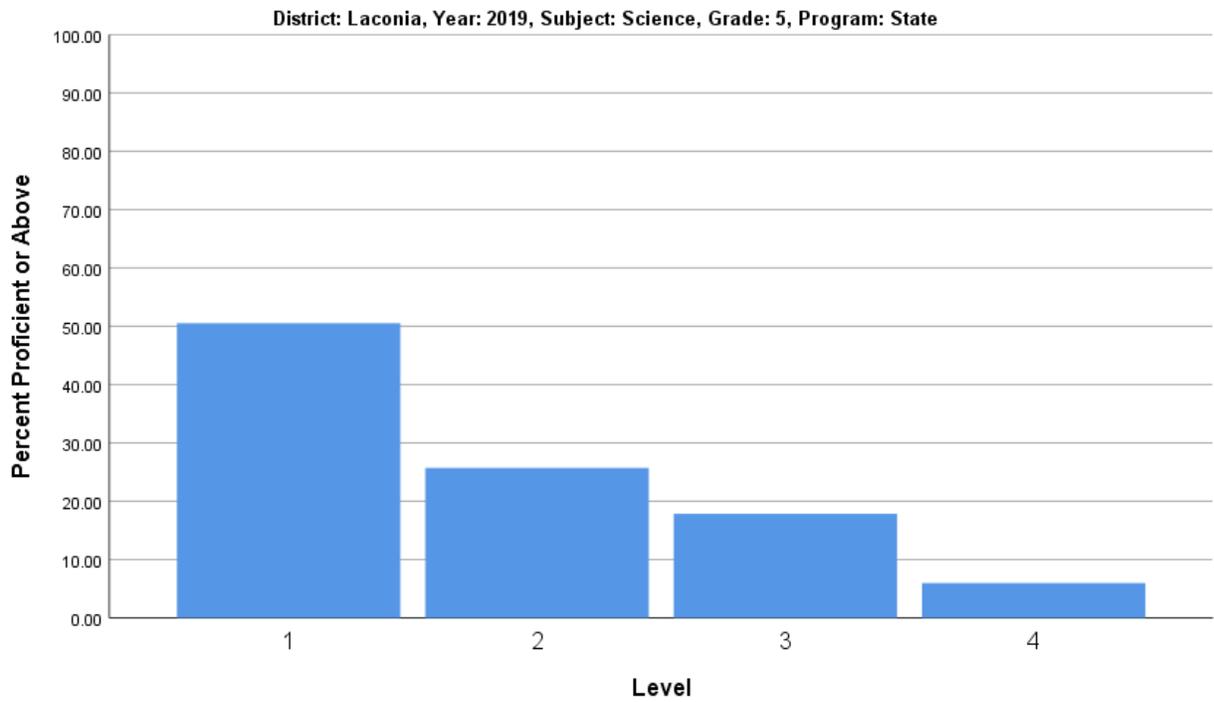
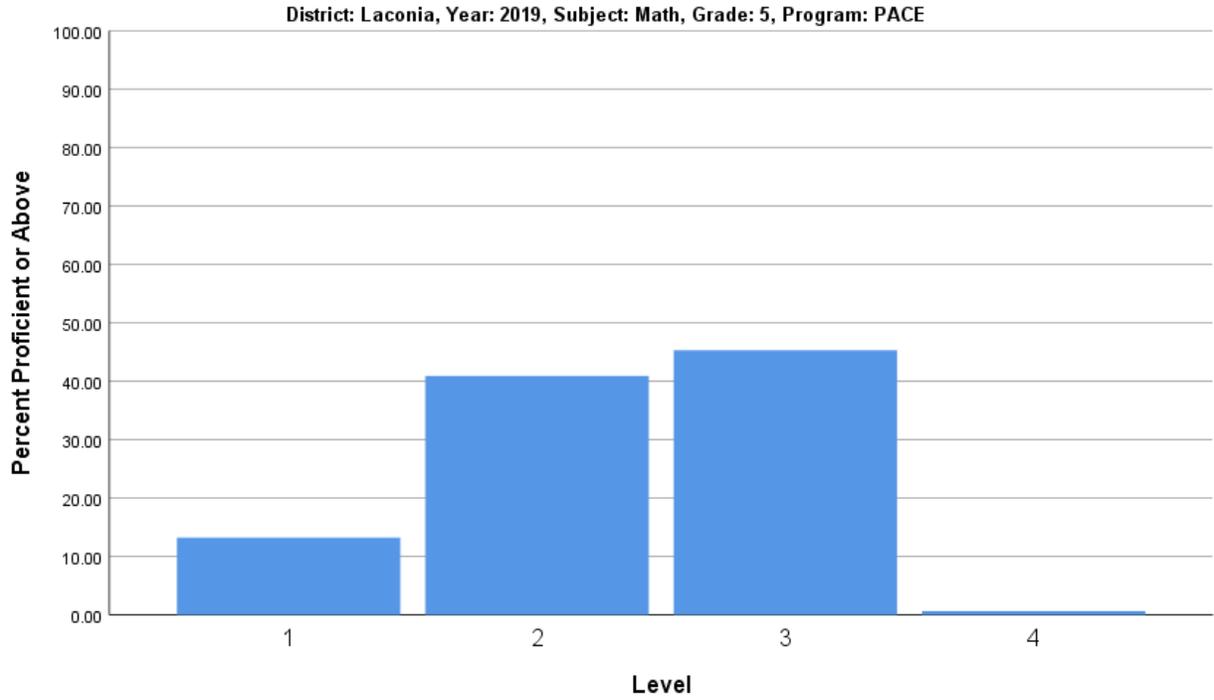


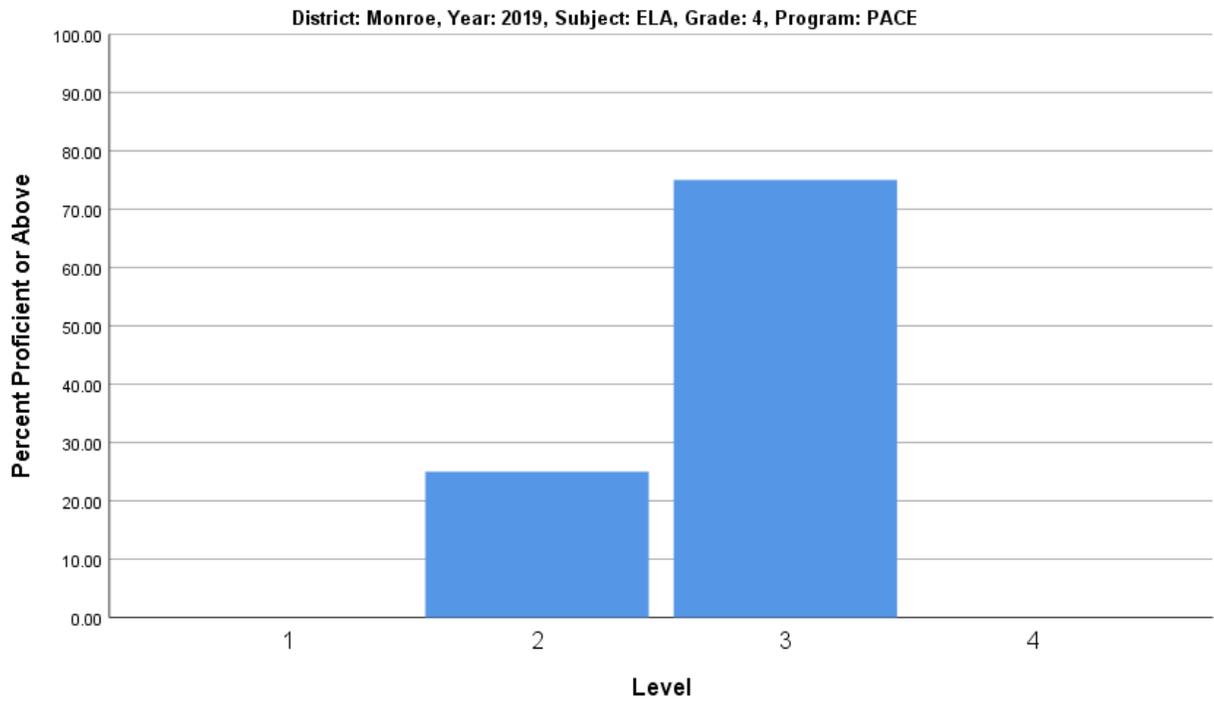
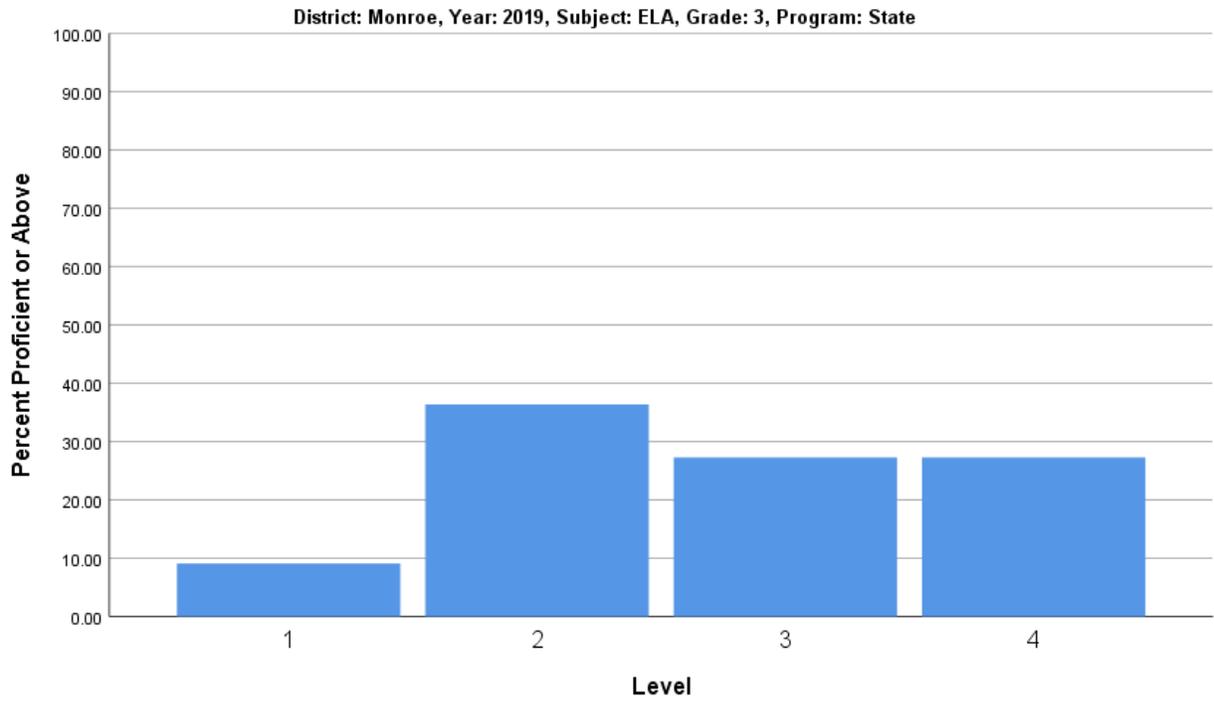




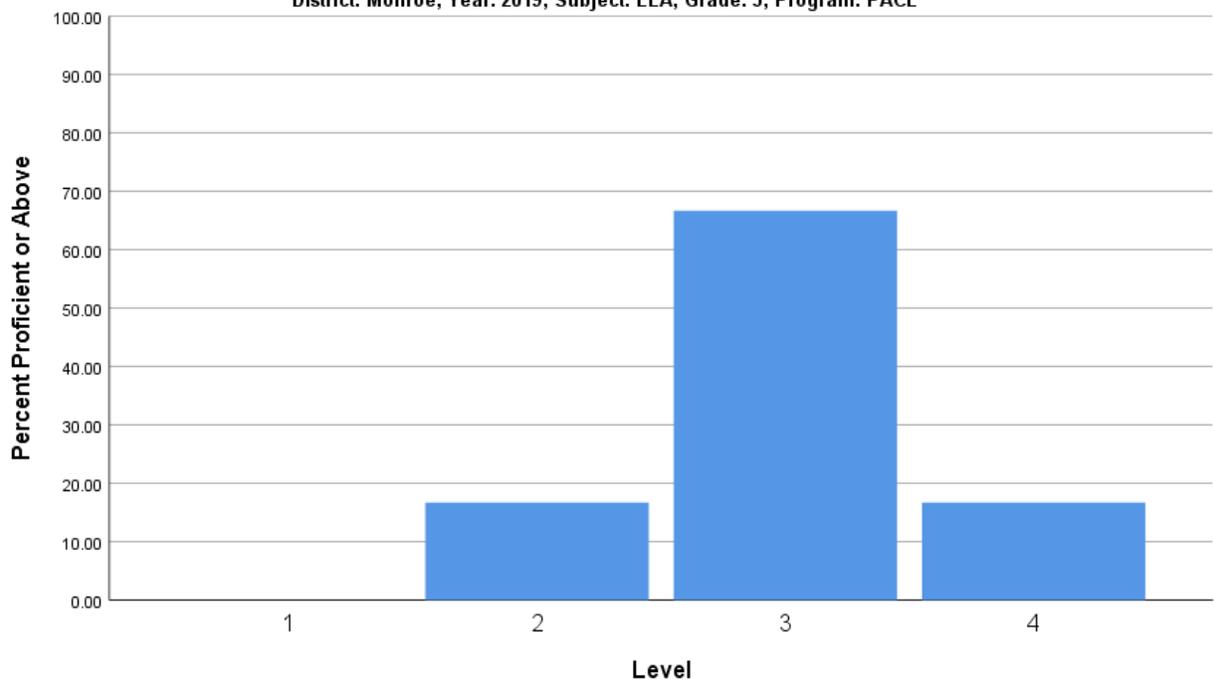
District: Laconia, Year: 2019, Subject: Math, Grade: 4, Program: State

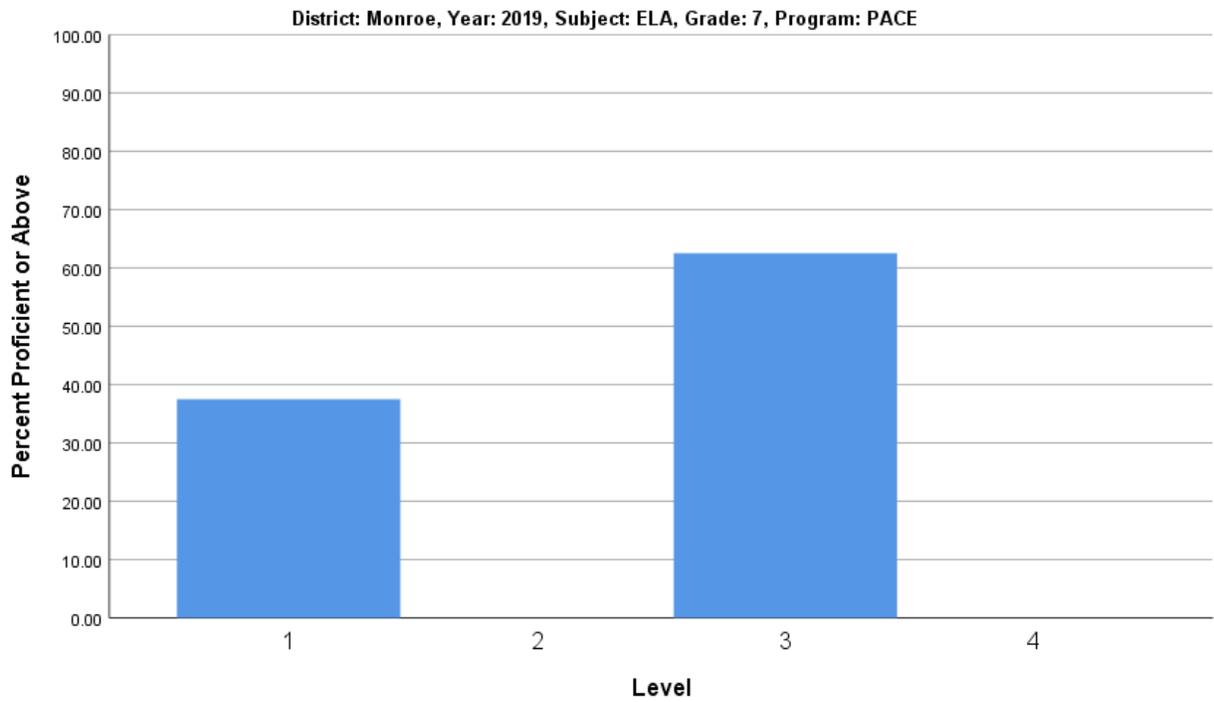
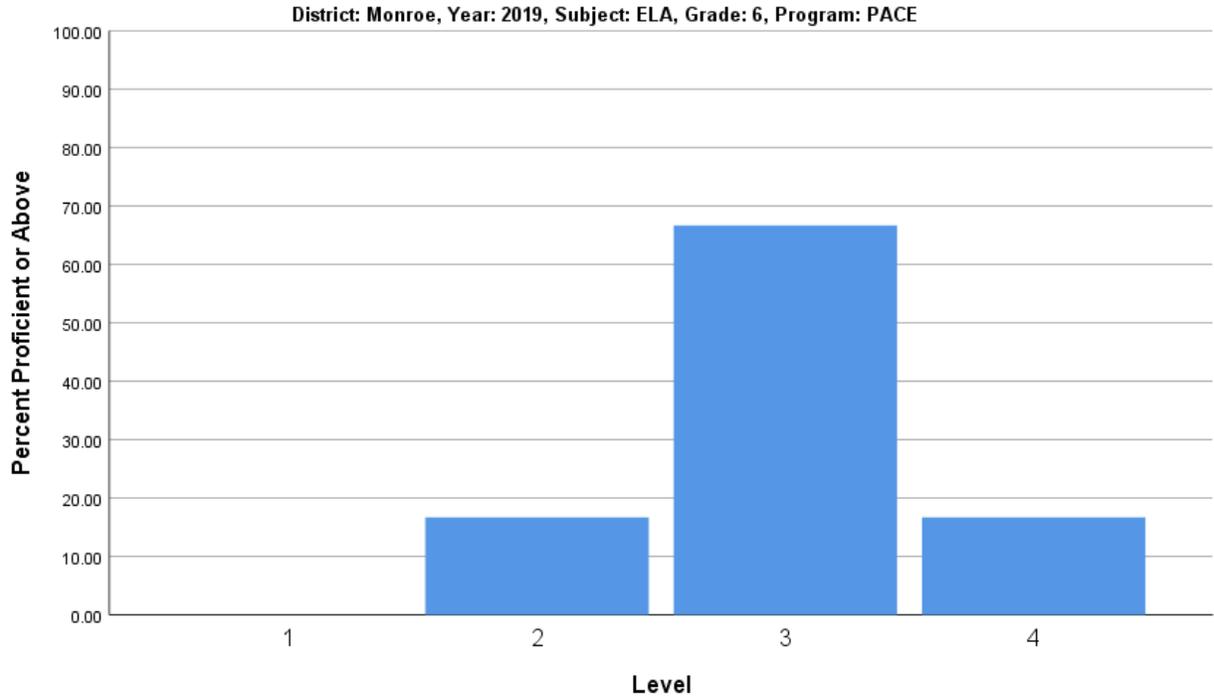


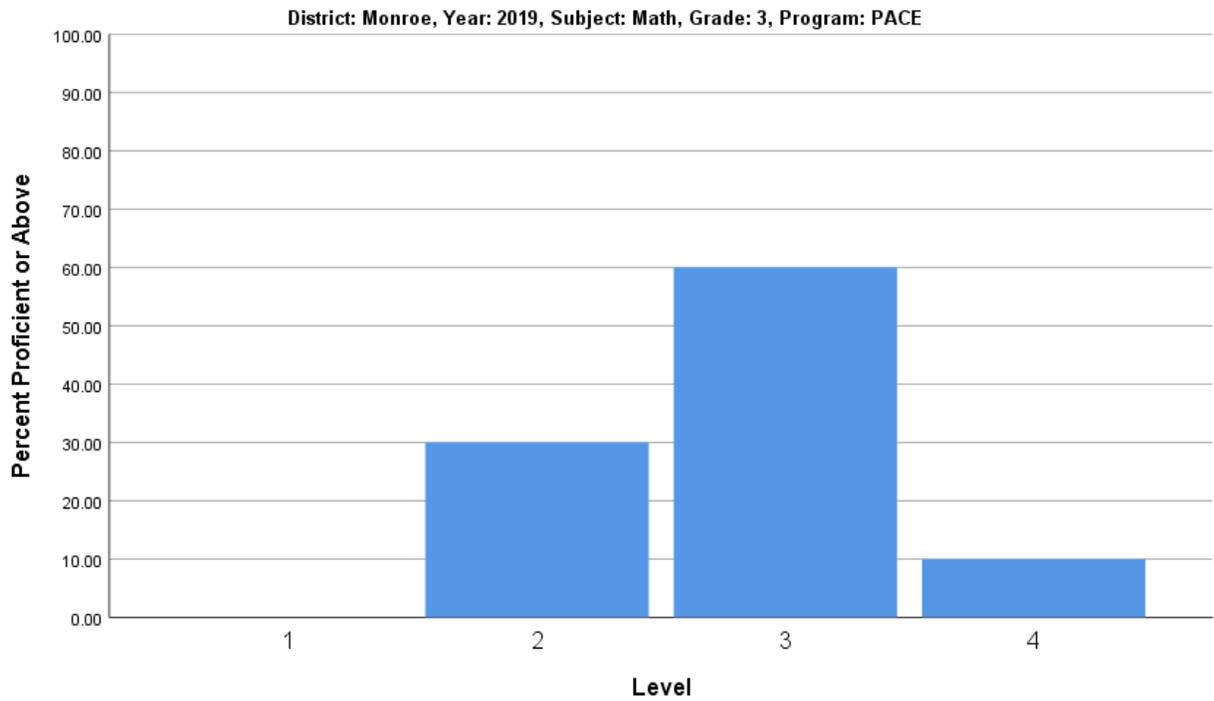
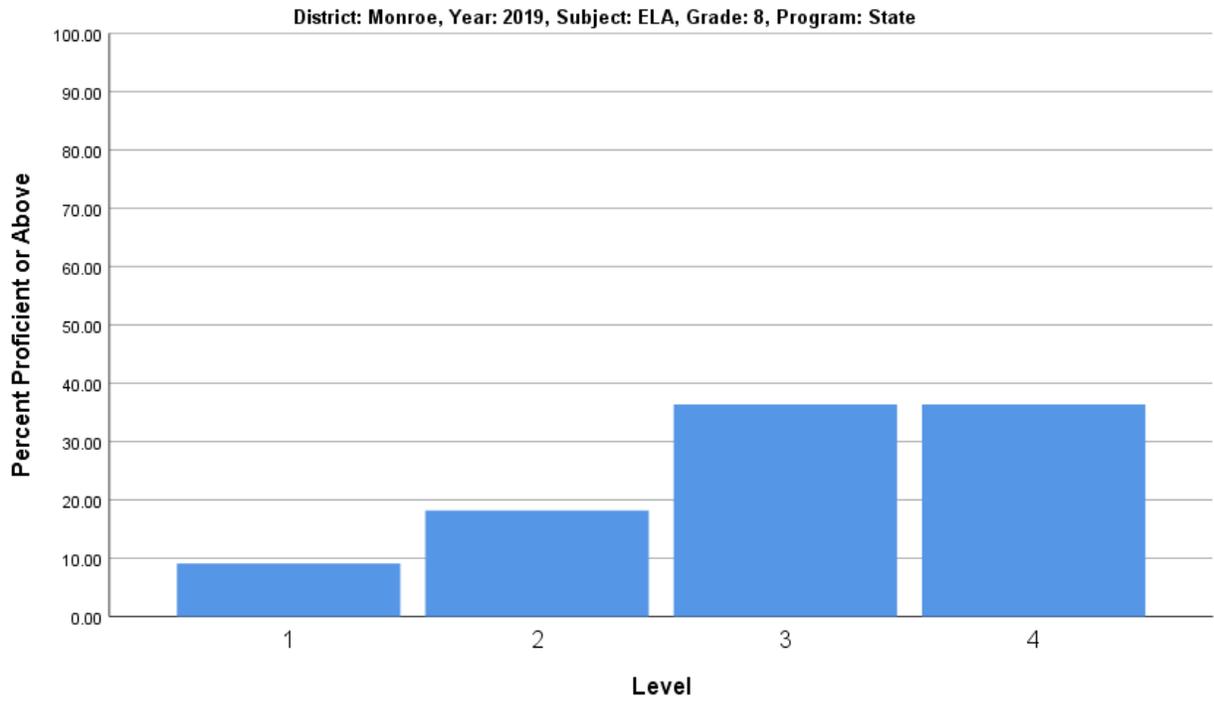




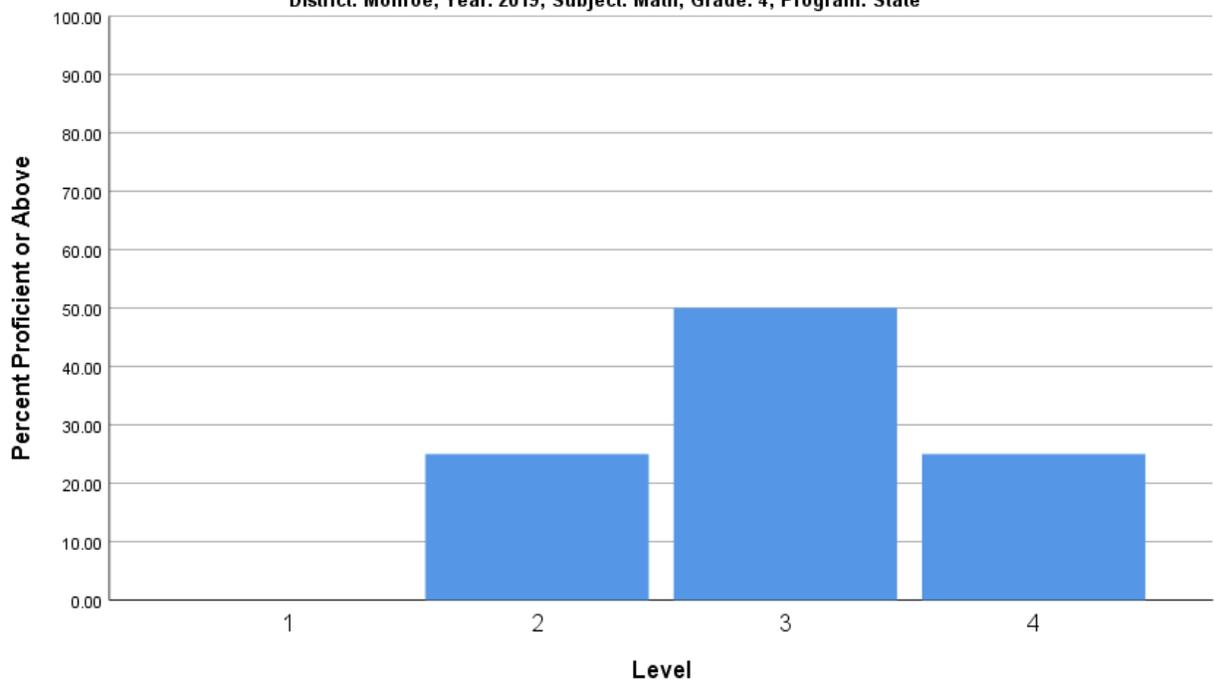
District: Monroe, Year: 2019, Subject: ELA, Grade: 5, Program: PACE

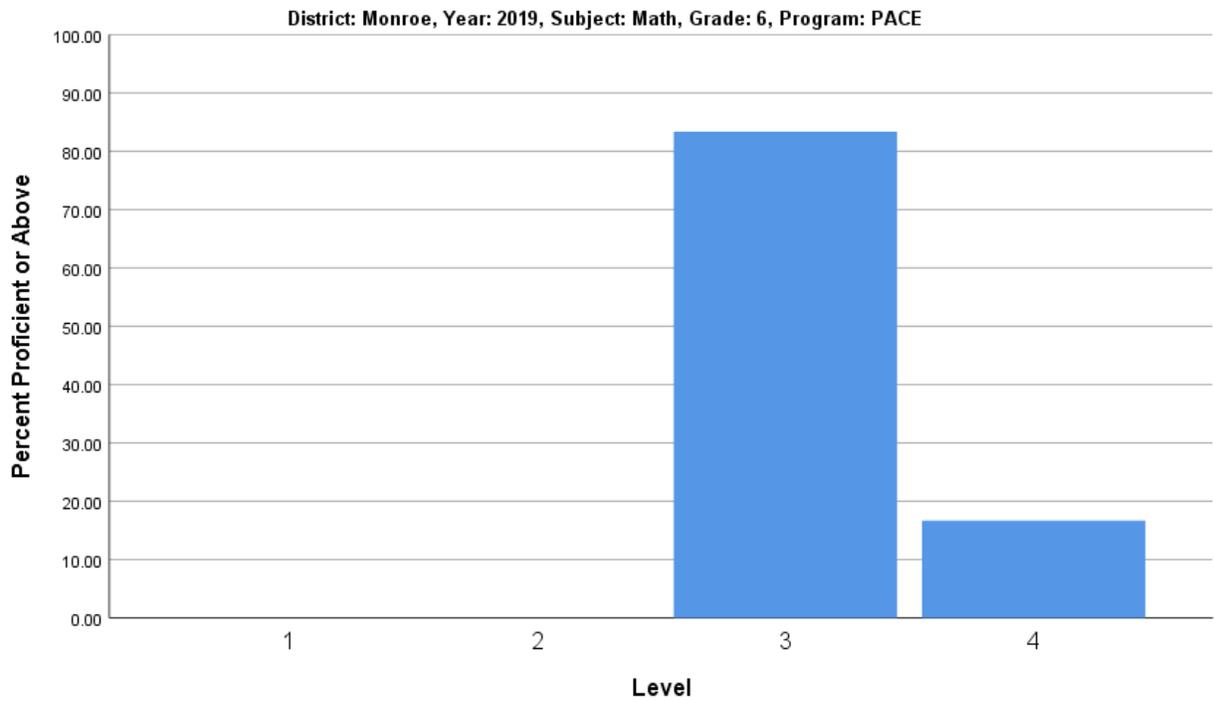
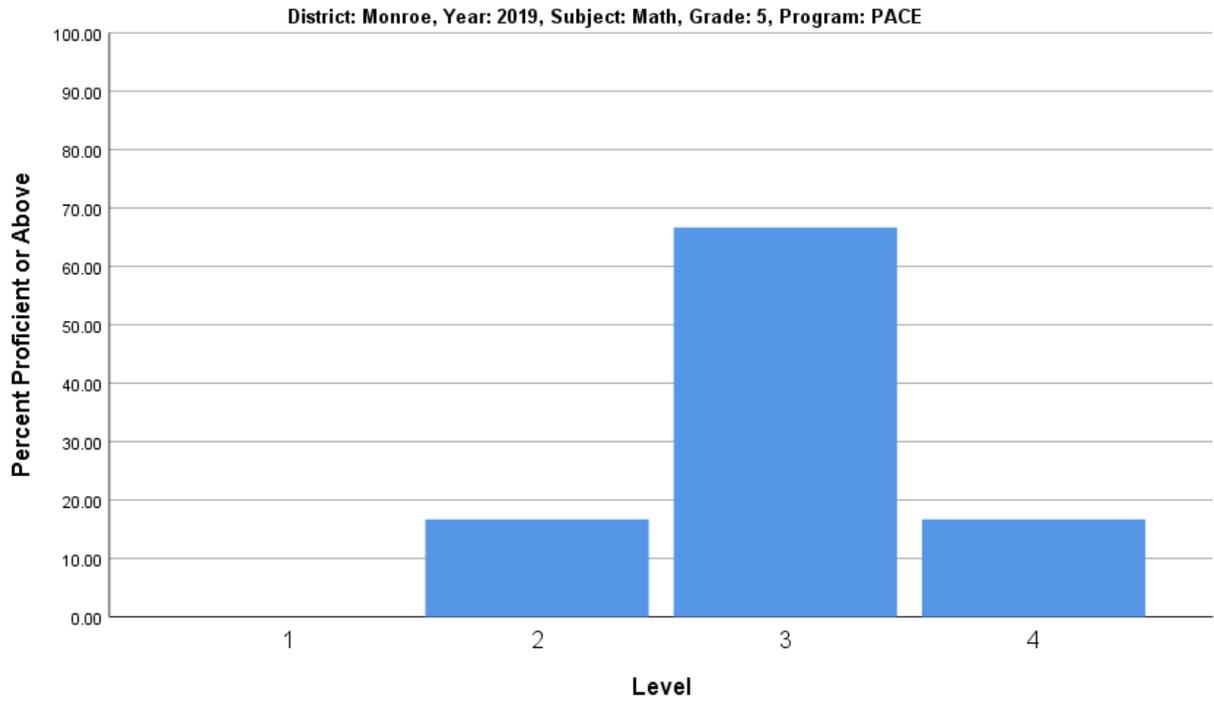


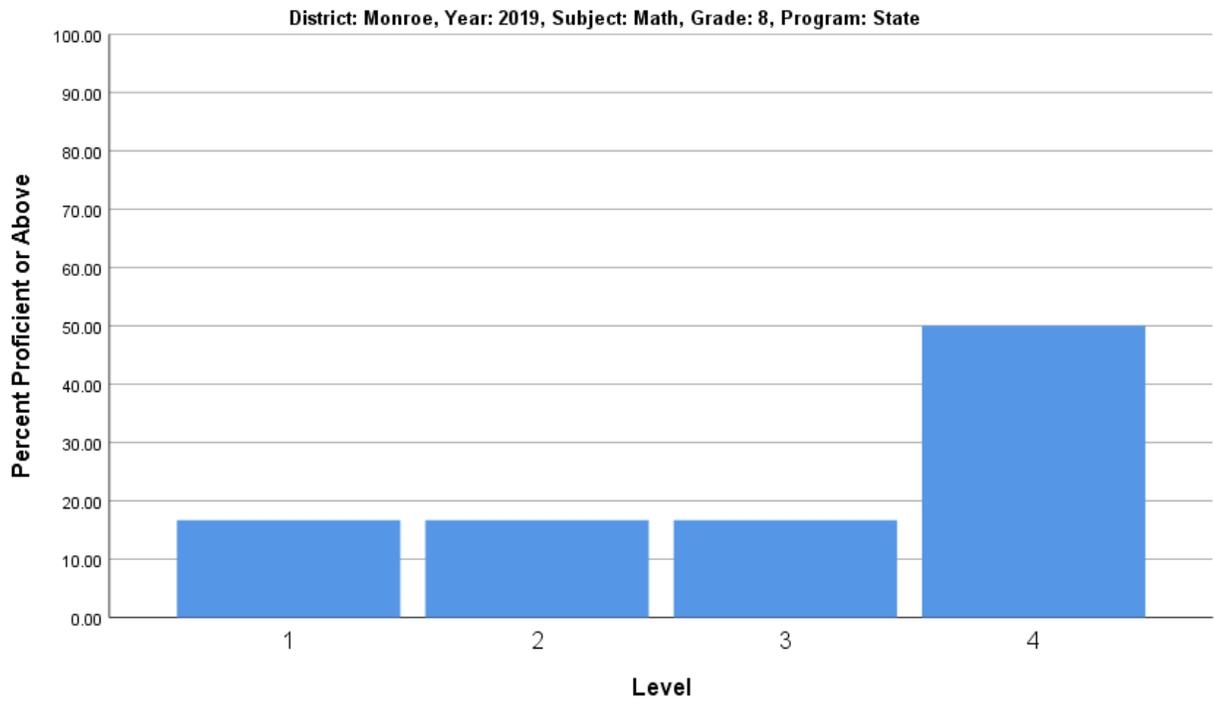
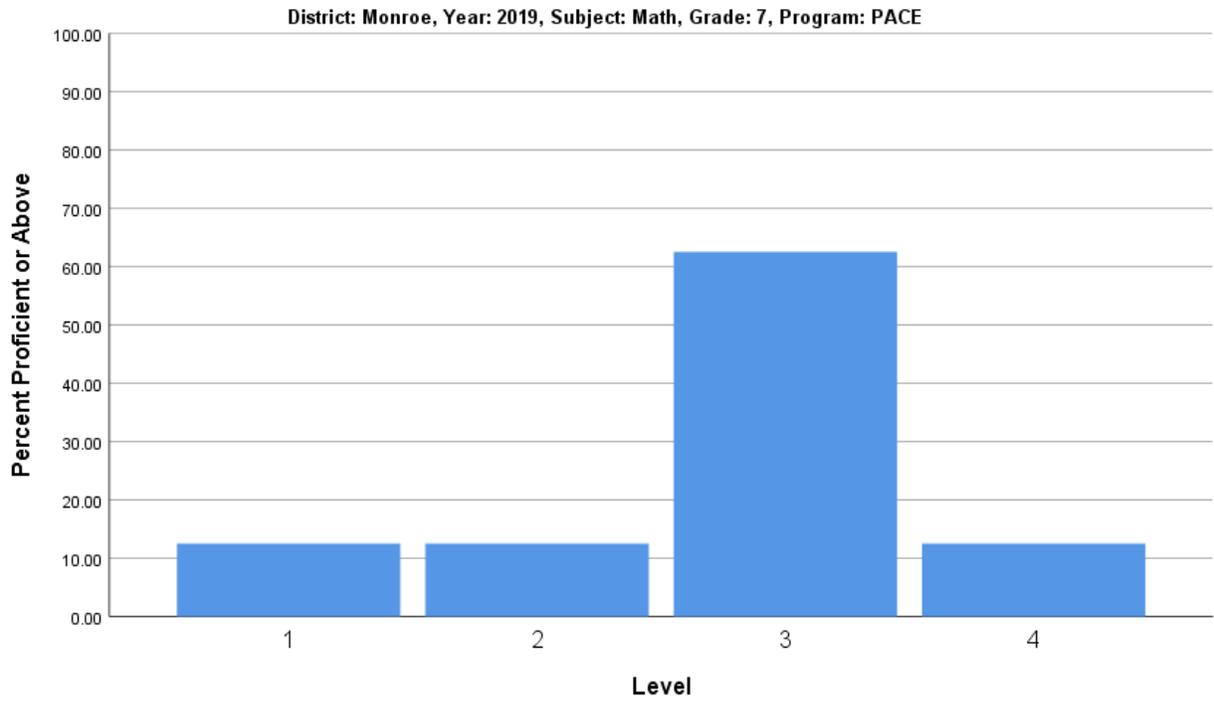




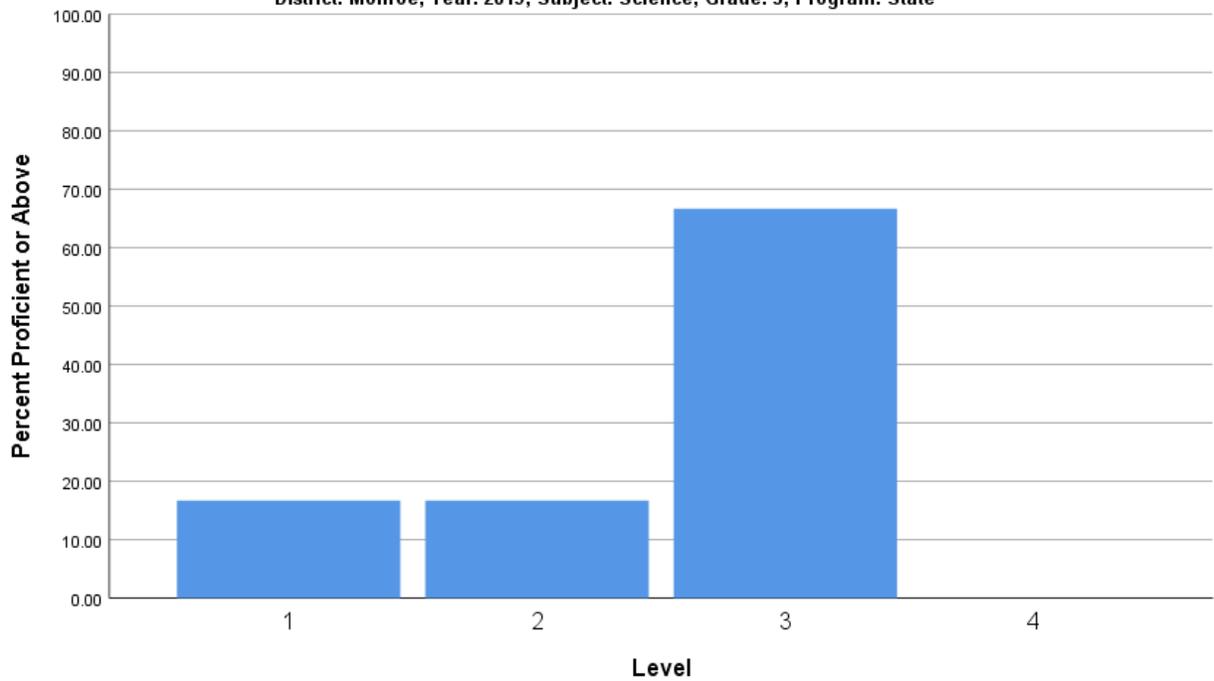
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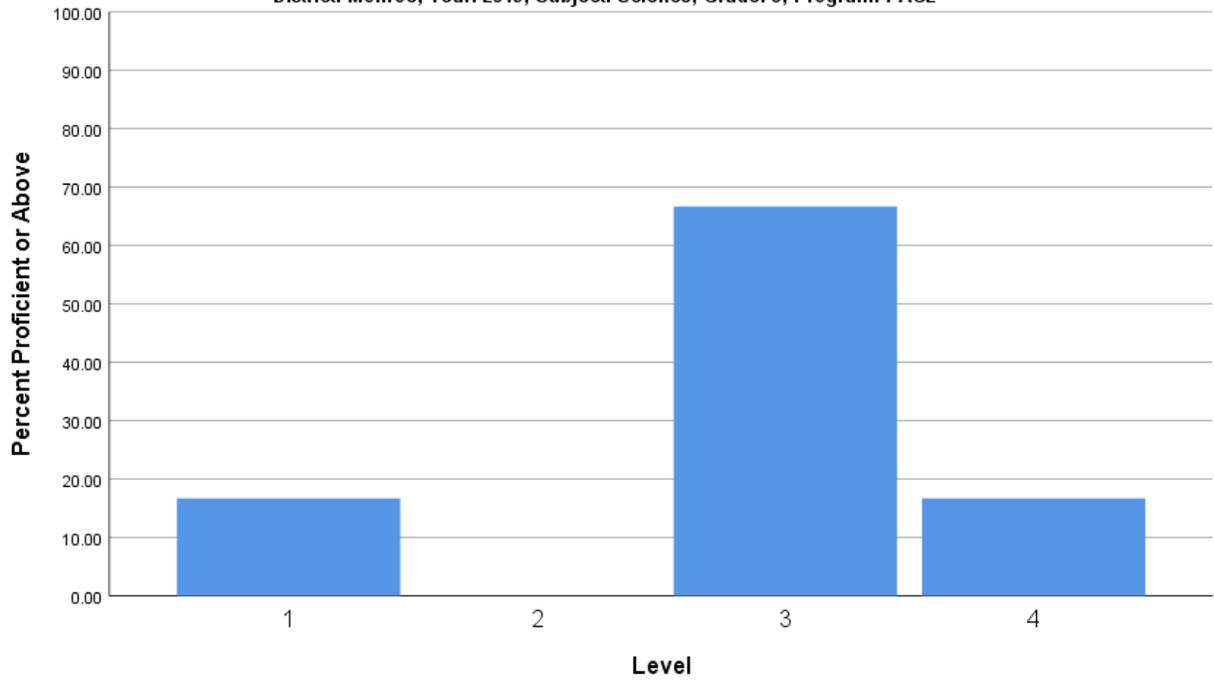




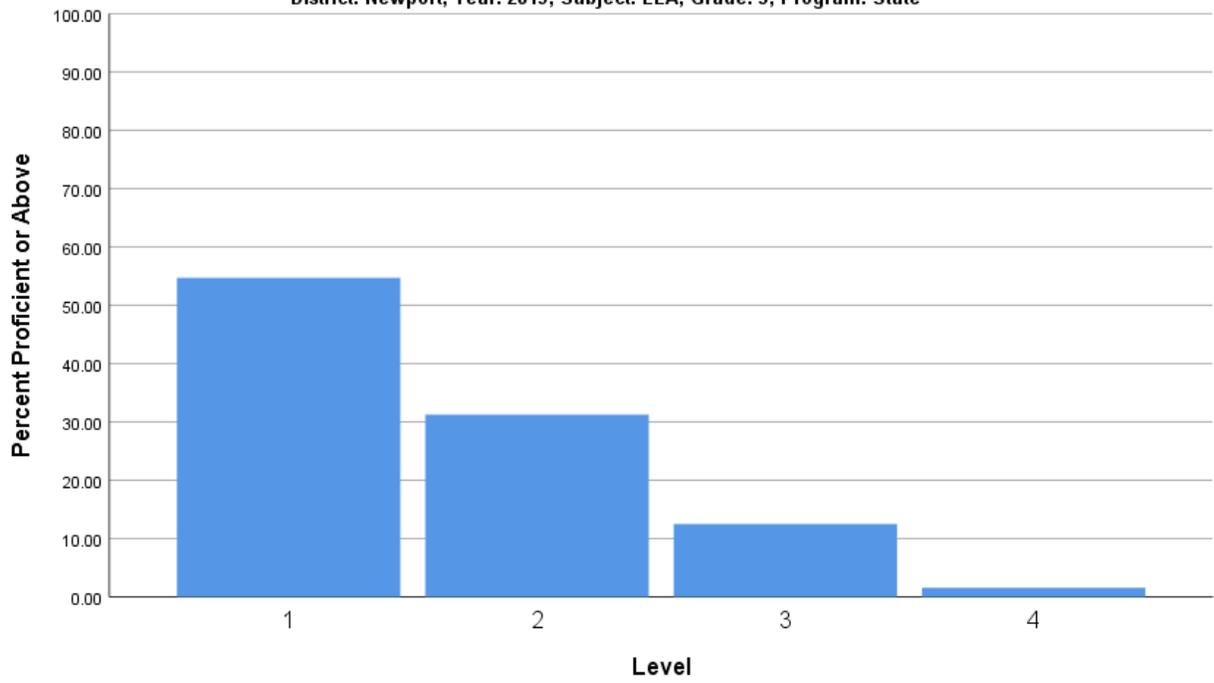
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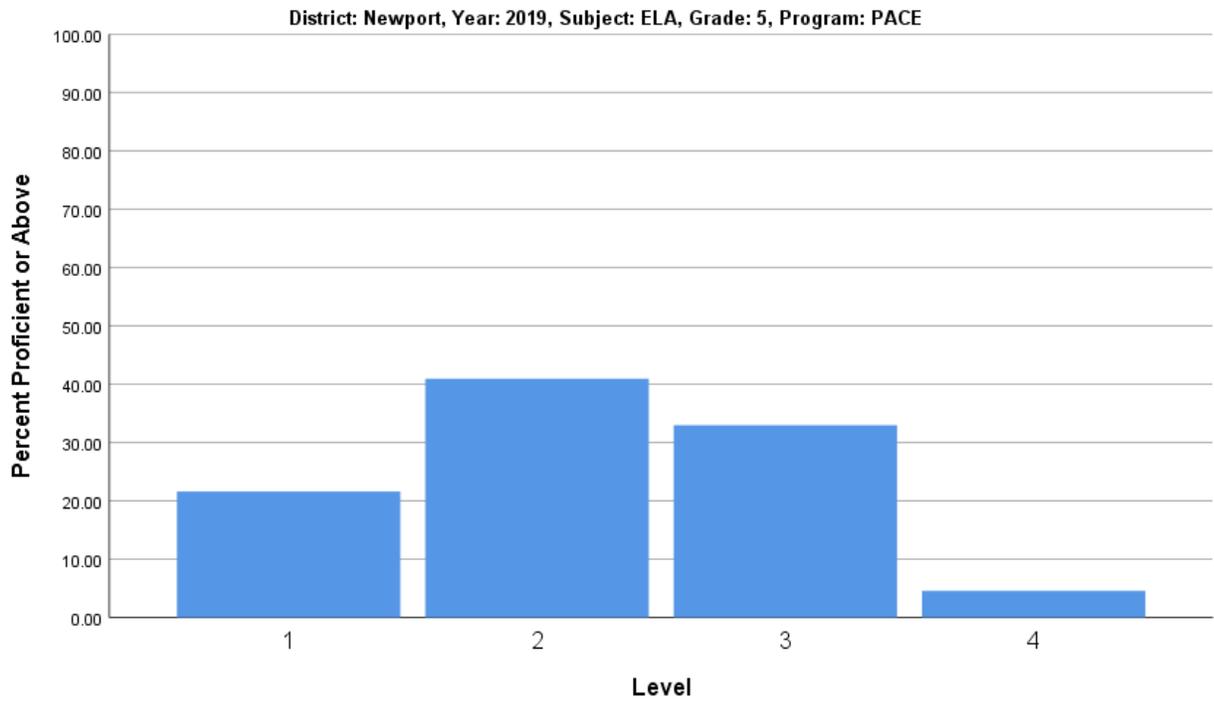
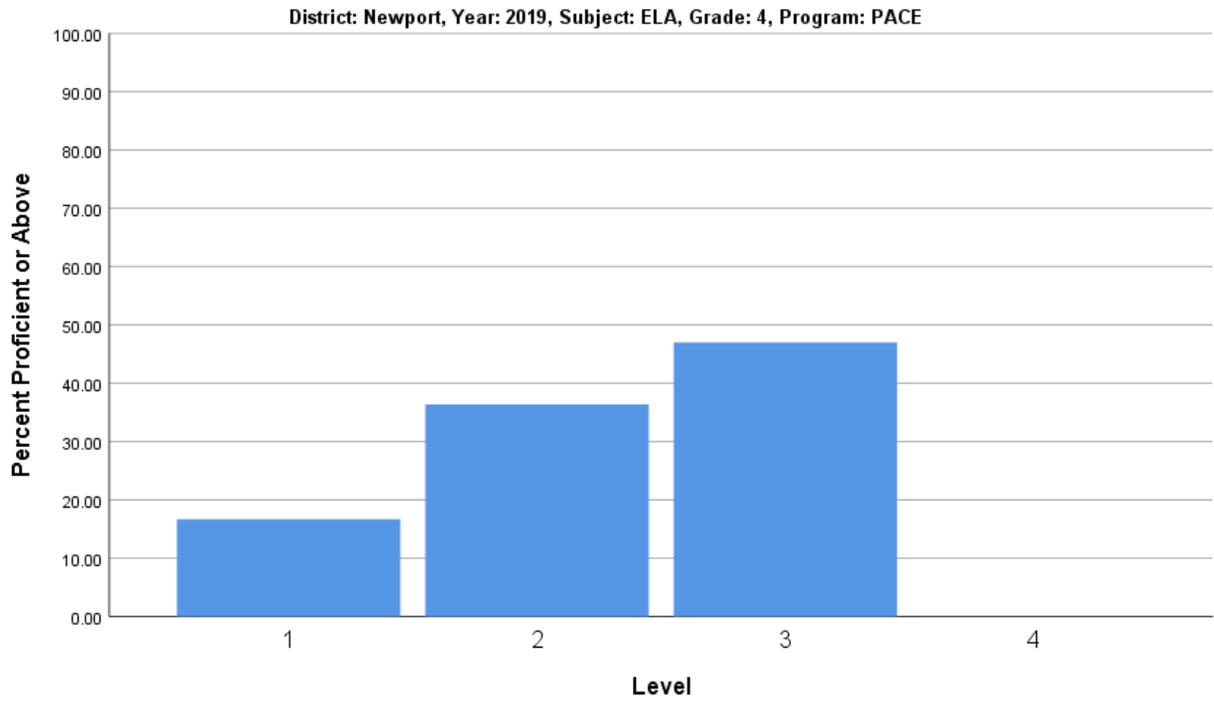


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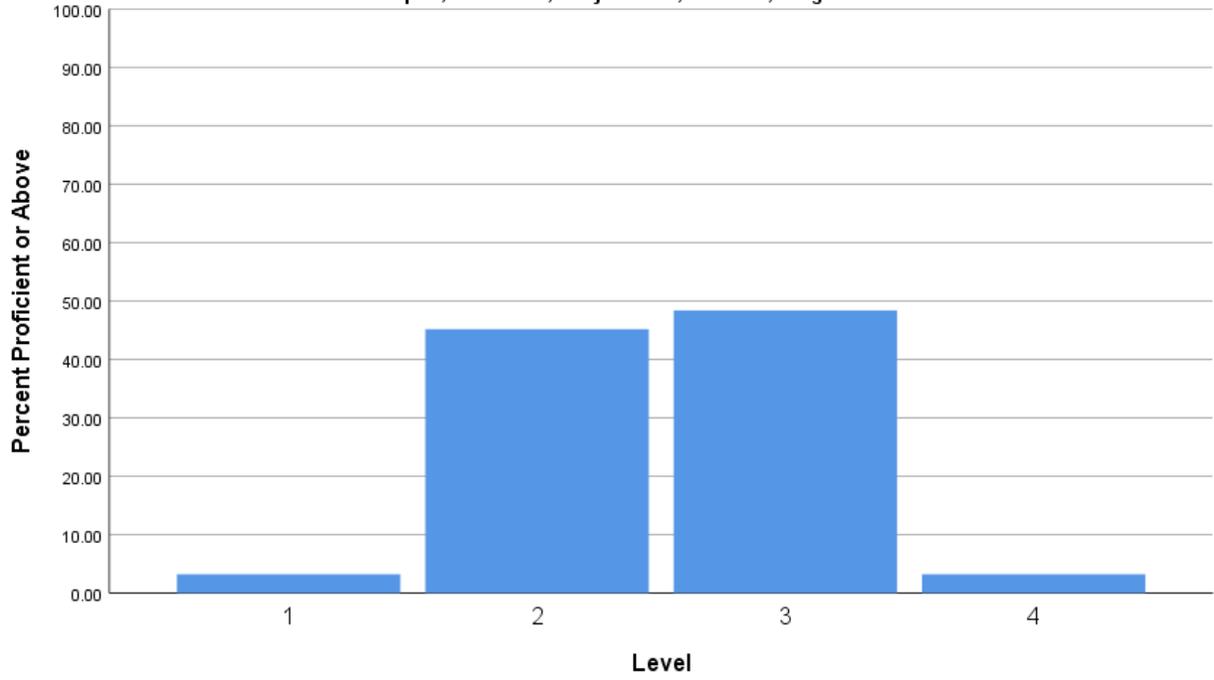


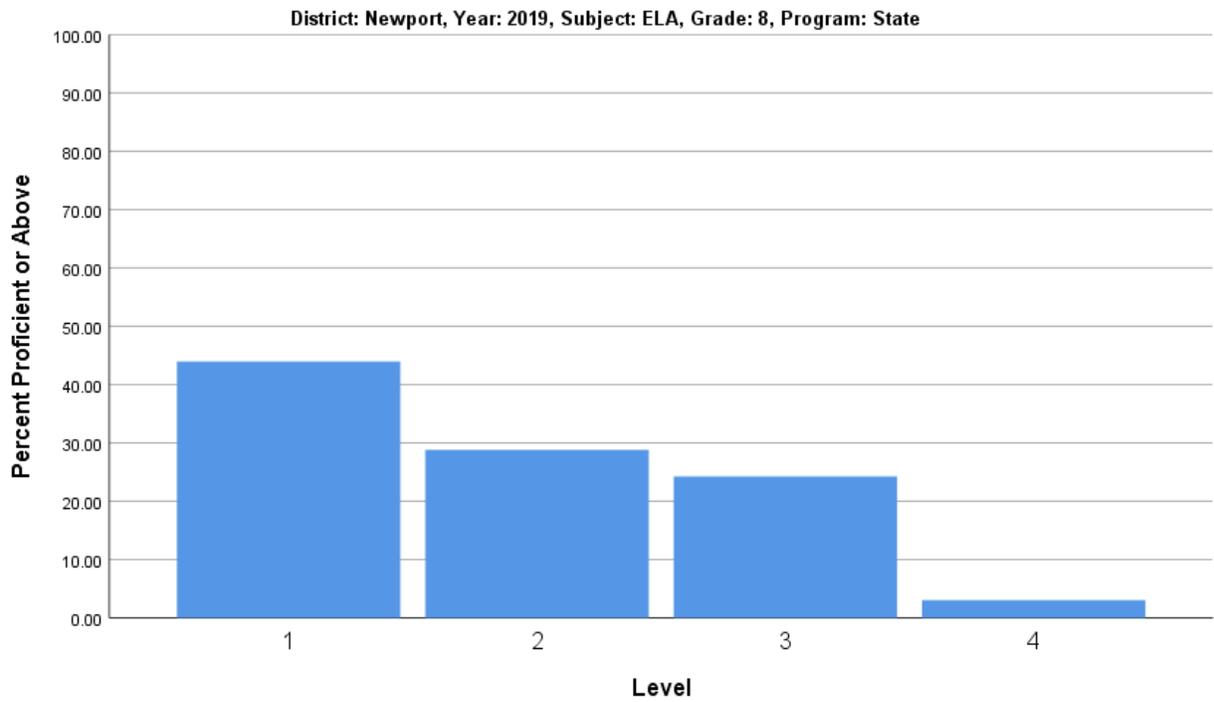
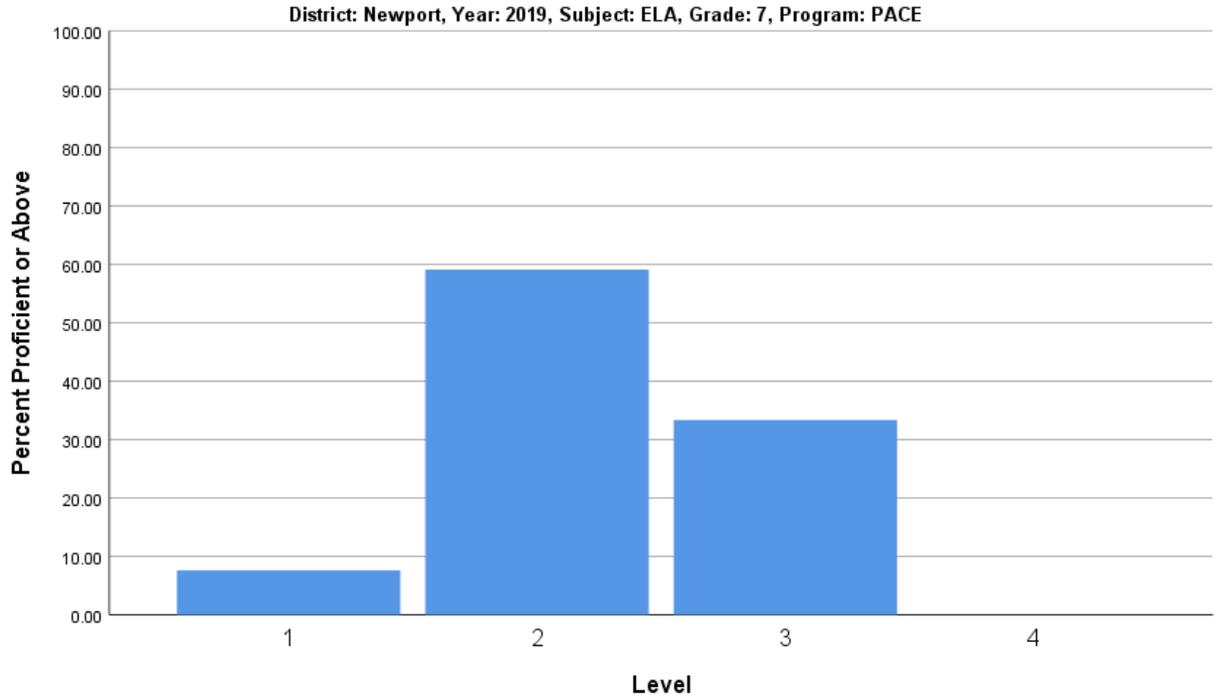
District: Newport, Year: 2019, Subject: ELA, Grade: 3, Program: State

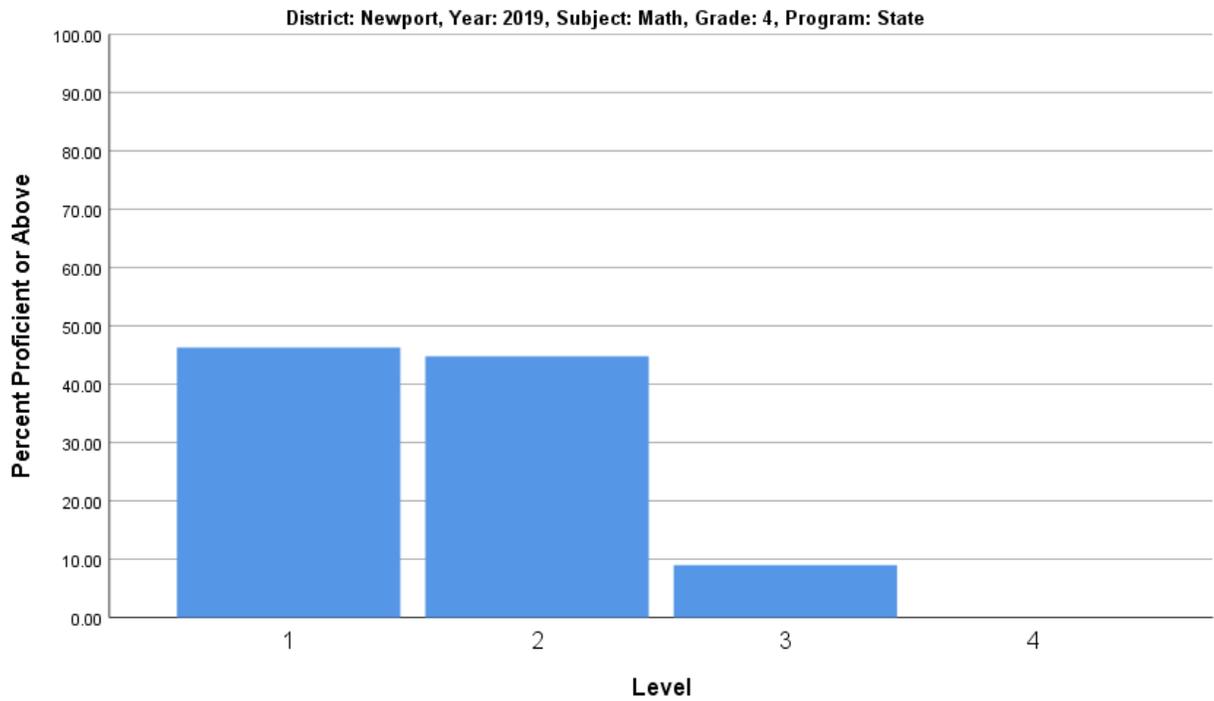
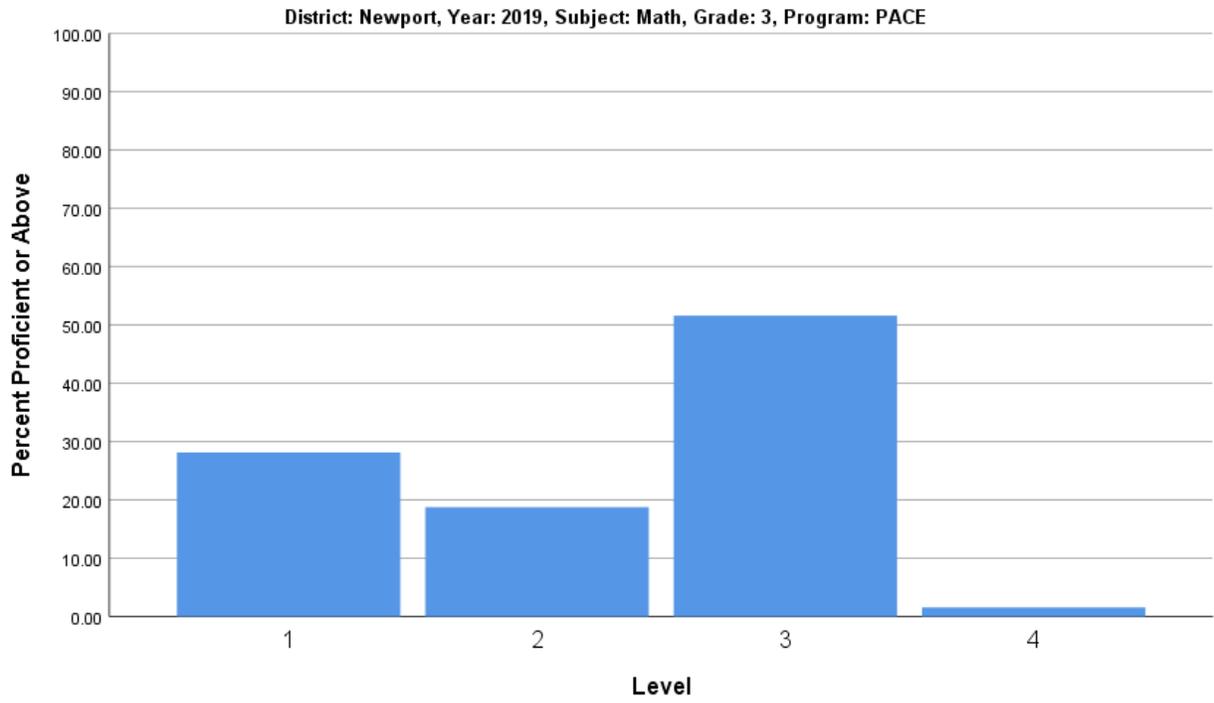




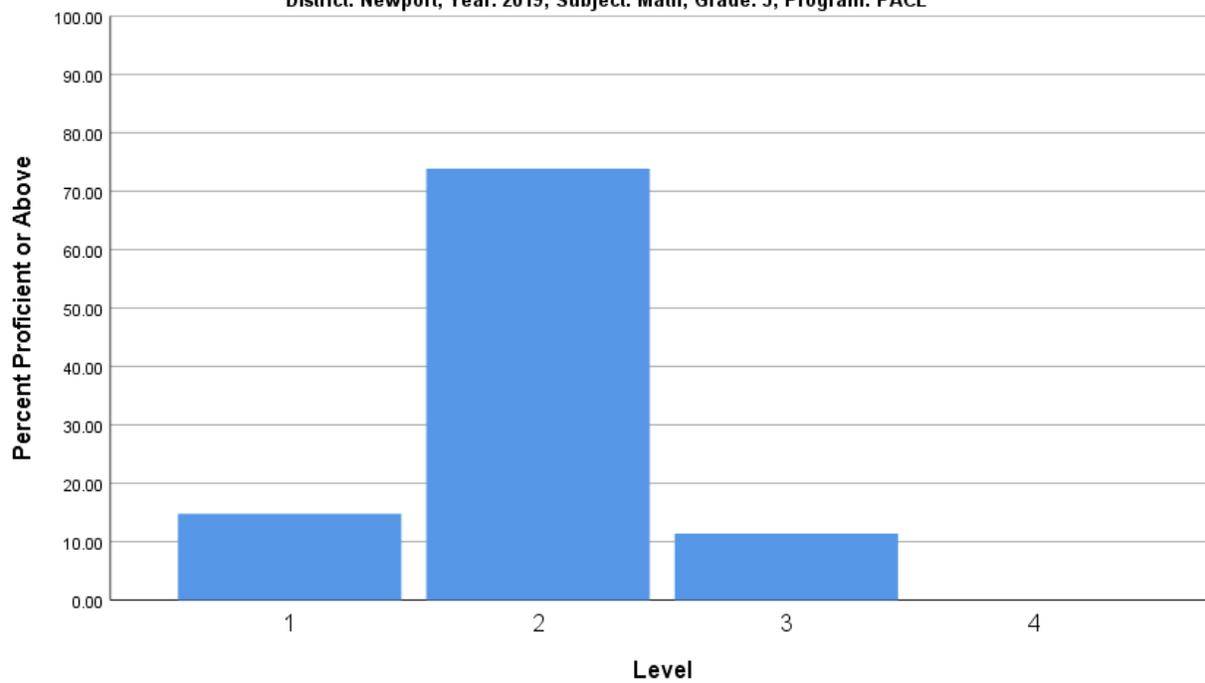
District: Newport, Year: 2019, Subject: ELA, Grade: 6, Program: PACE

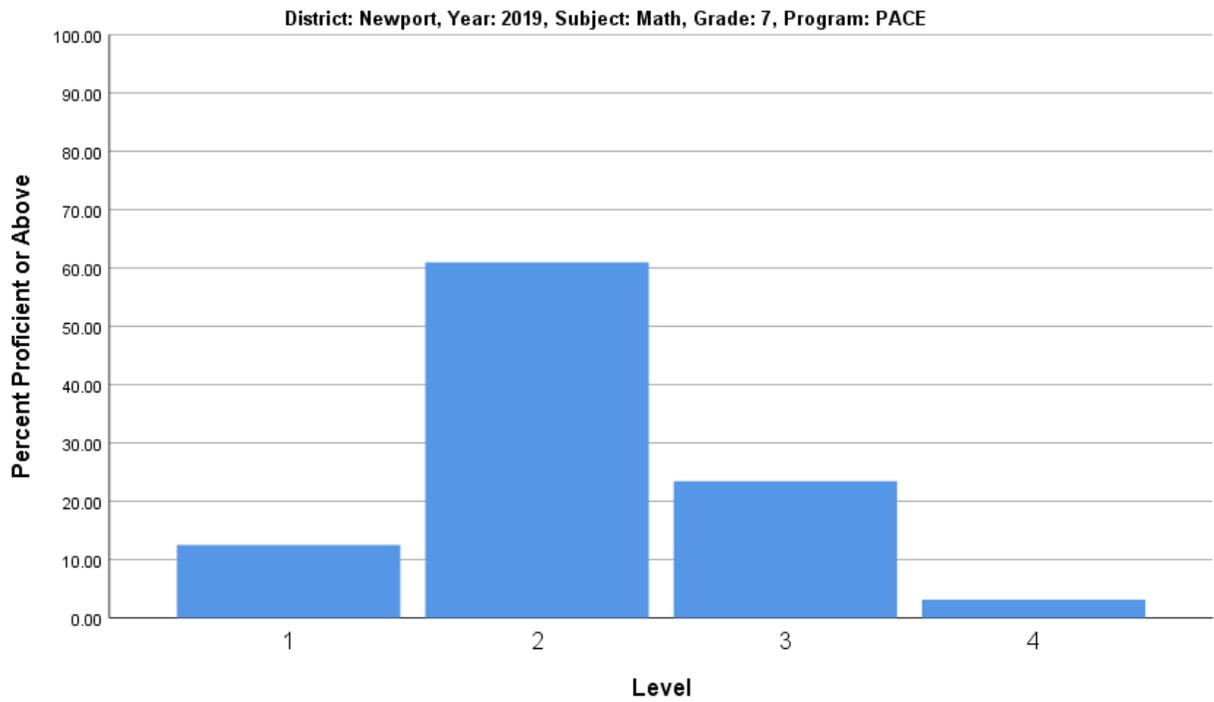
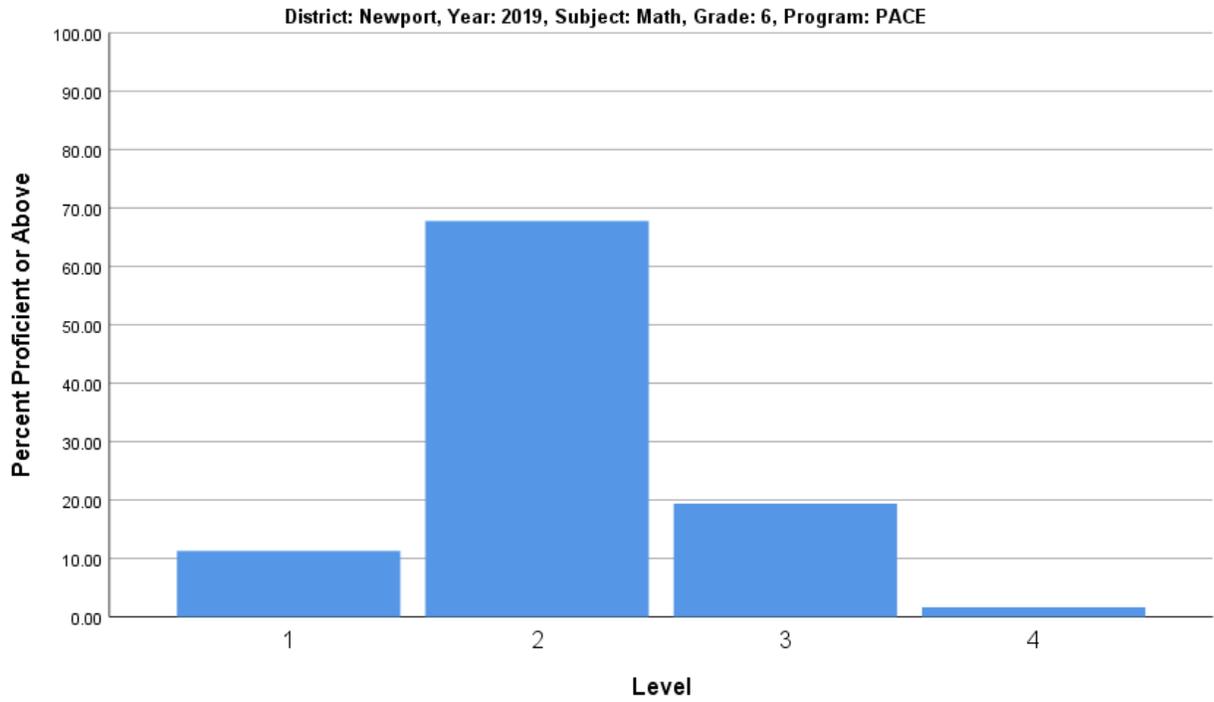


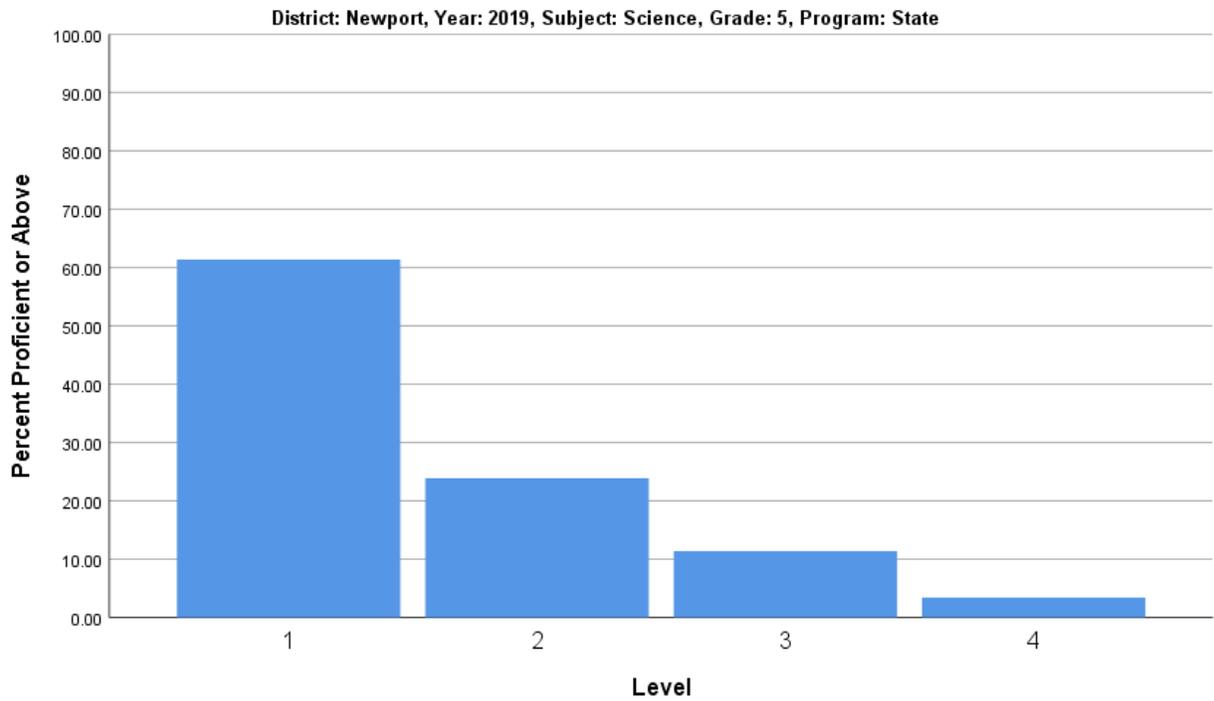
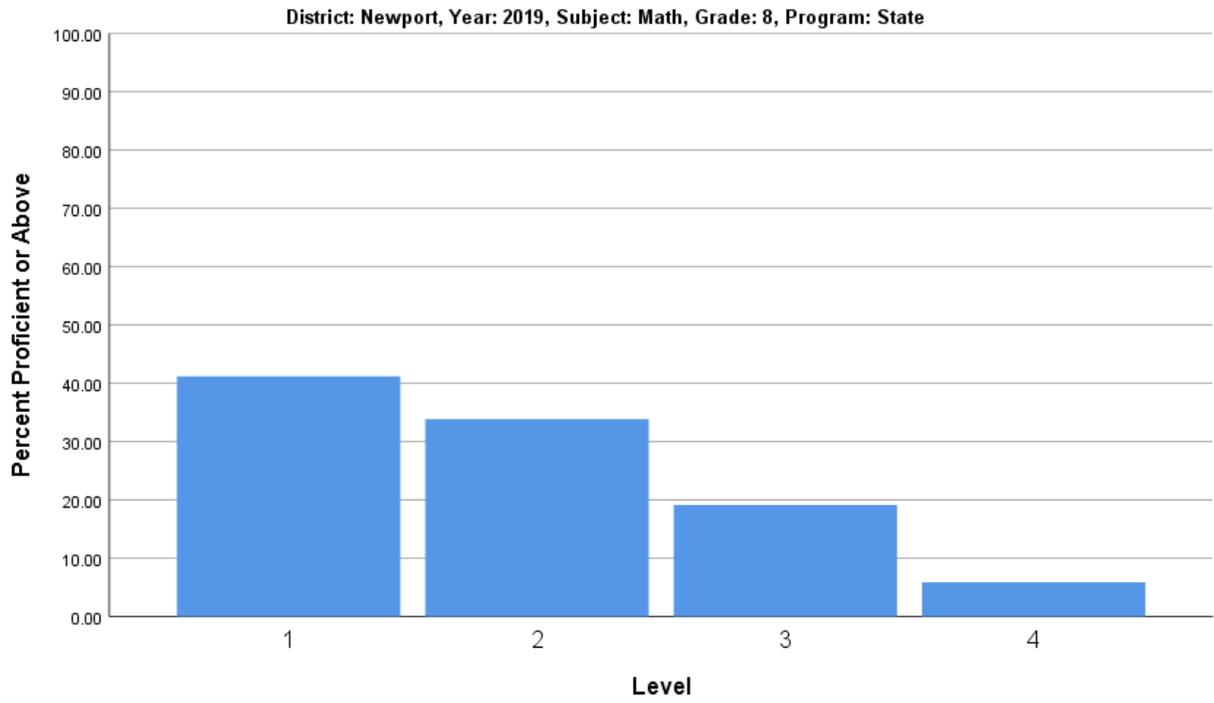




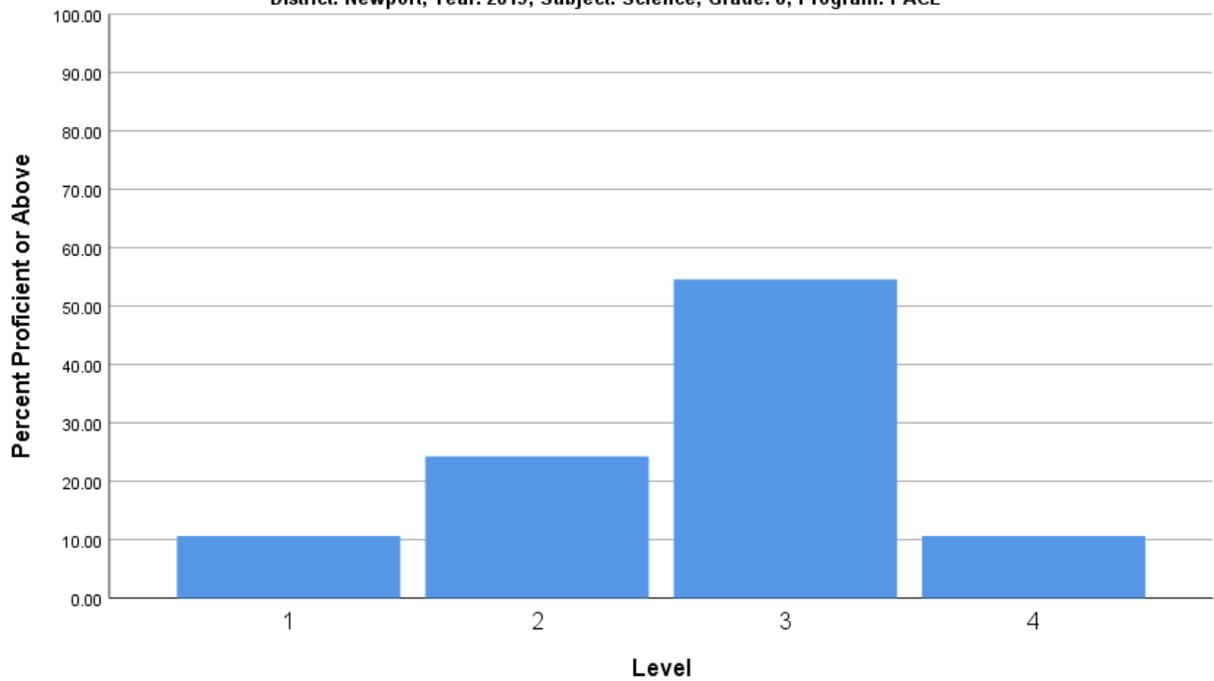
District: Newport, Year: 2019, Subject: Math, Grade: 5, Program: PACE

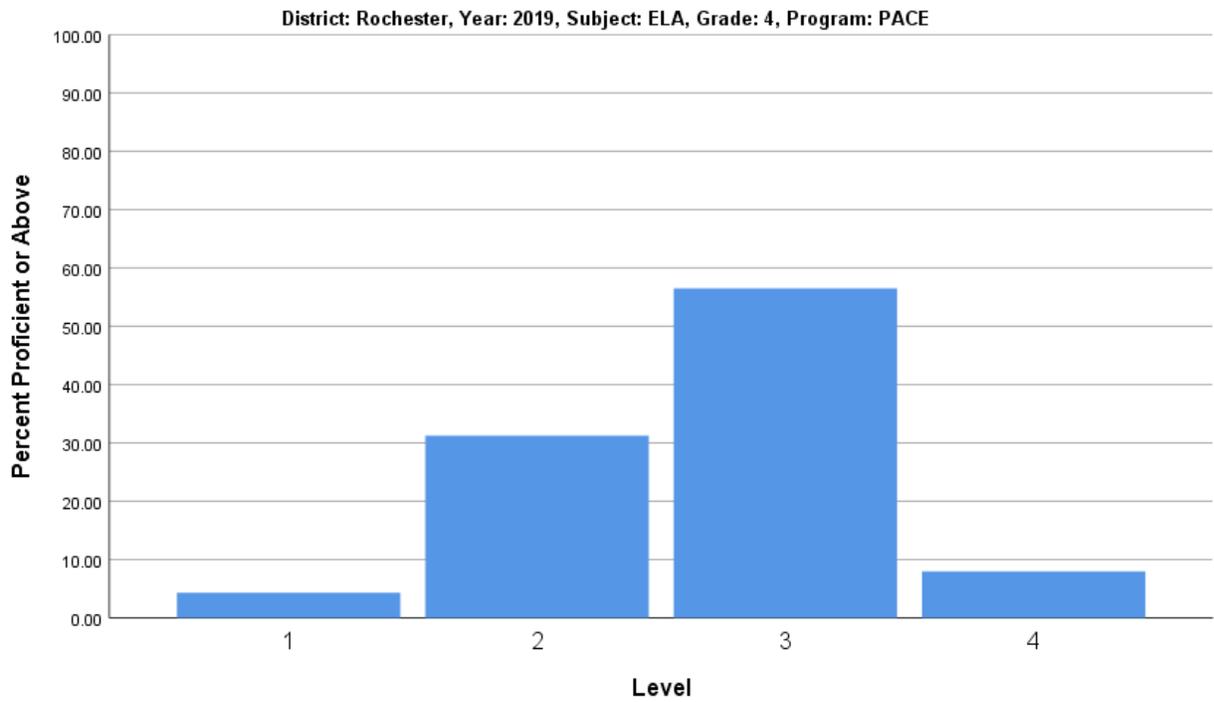
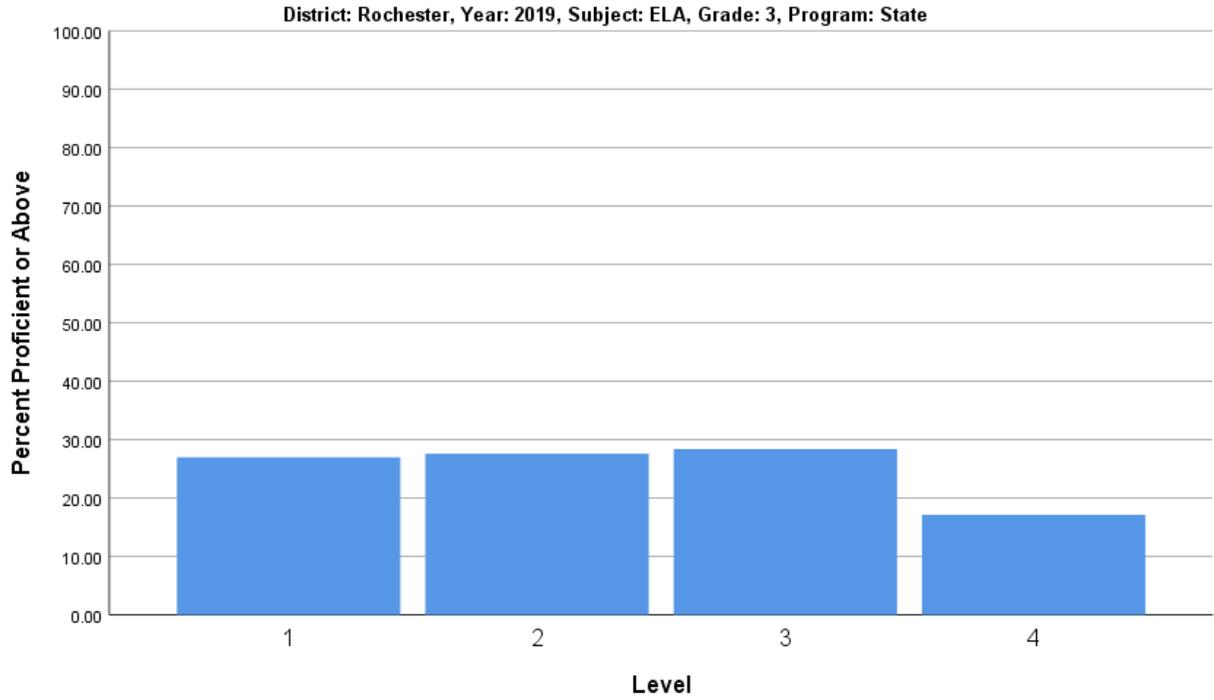


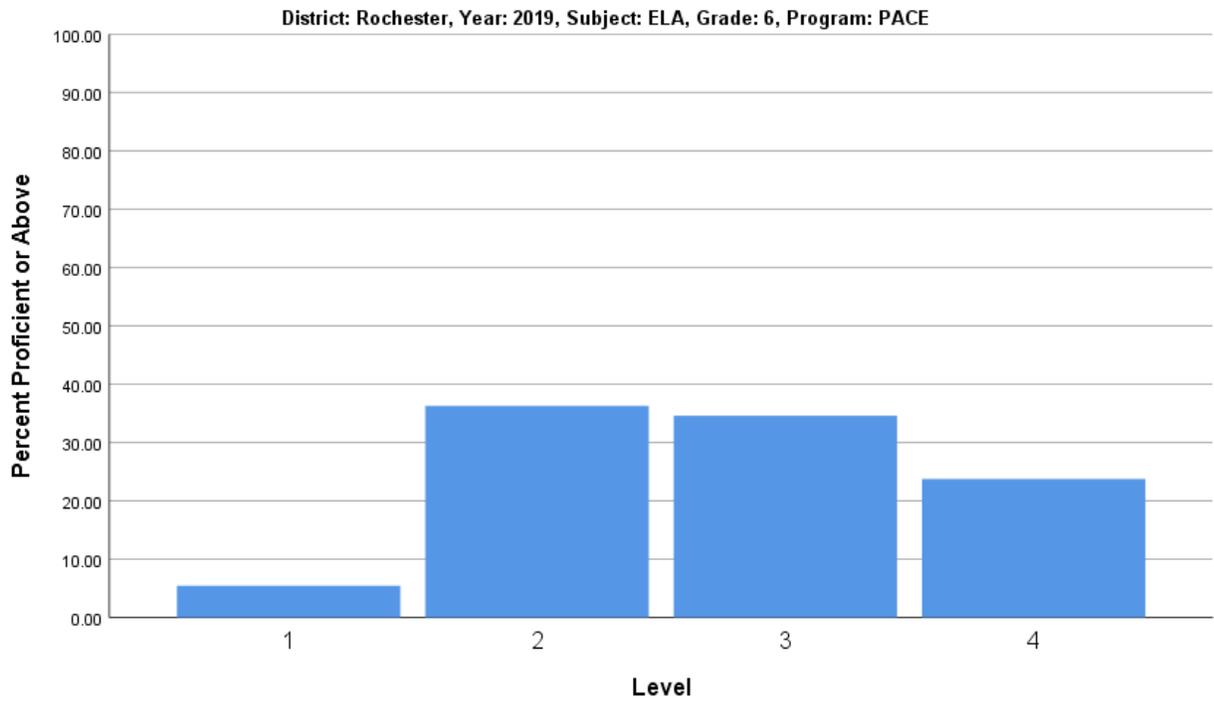
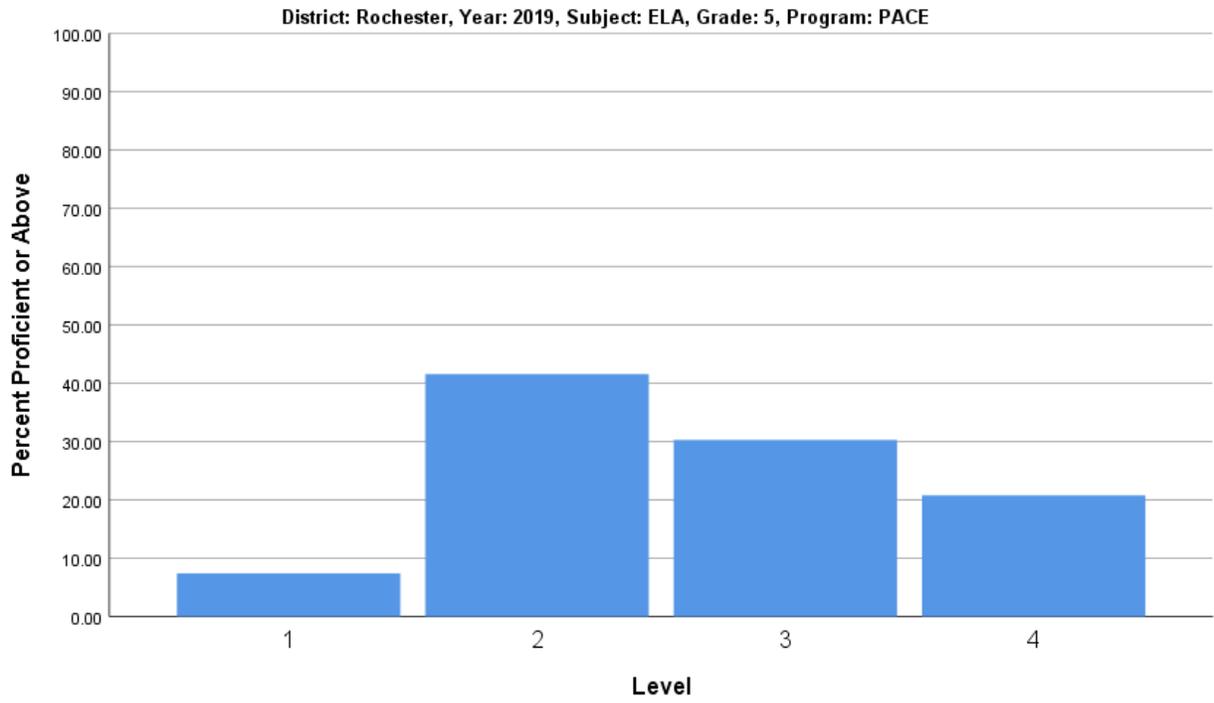




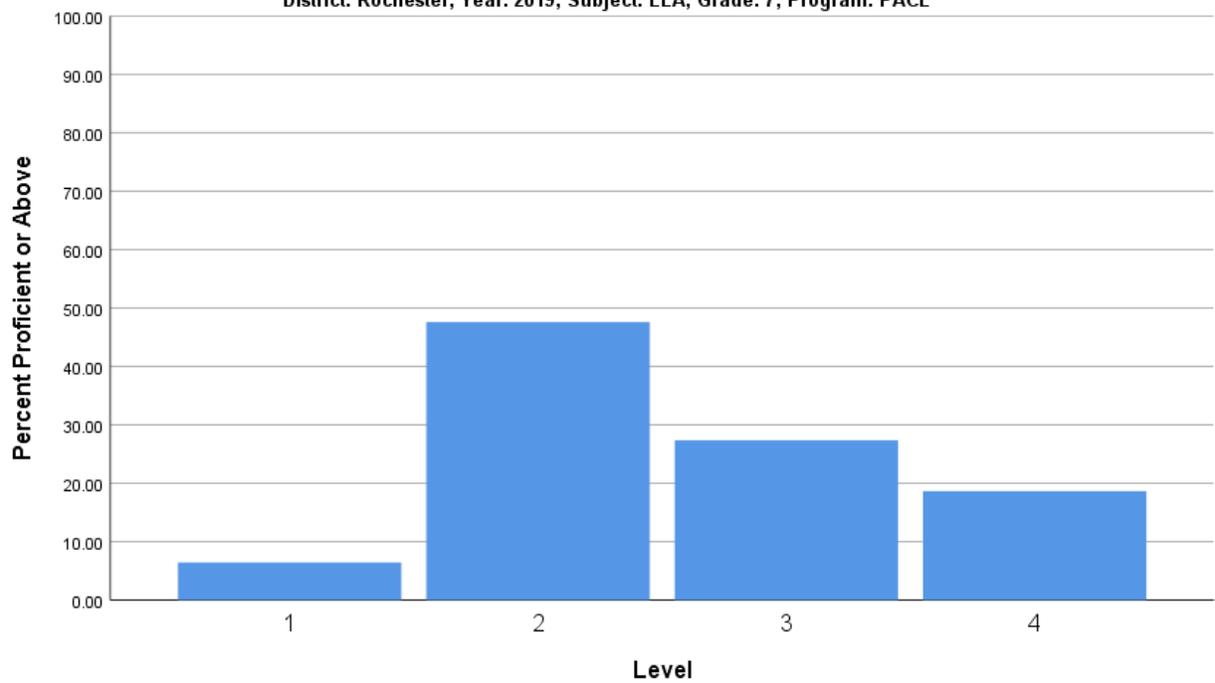
District: Newport, Year: 2019, Subject: Science, Grade: 8, Program: PACE



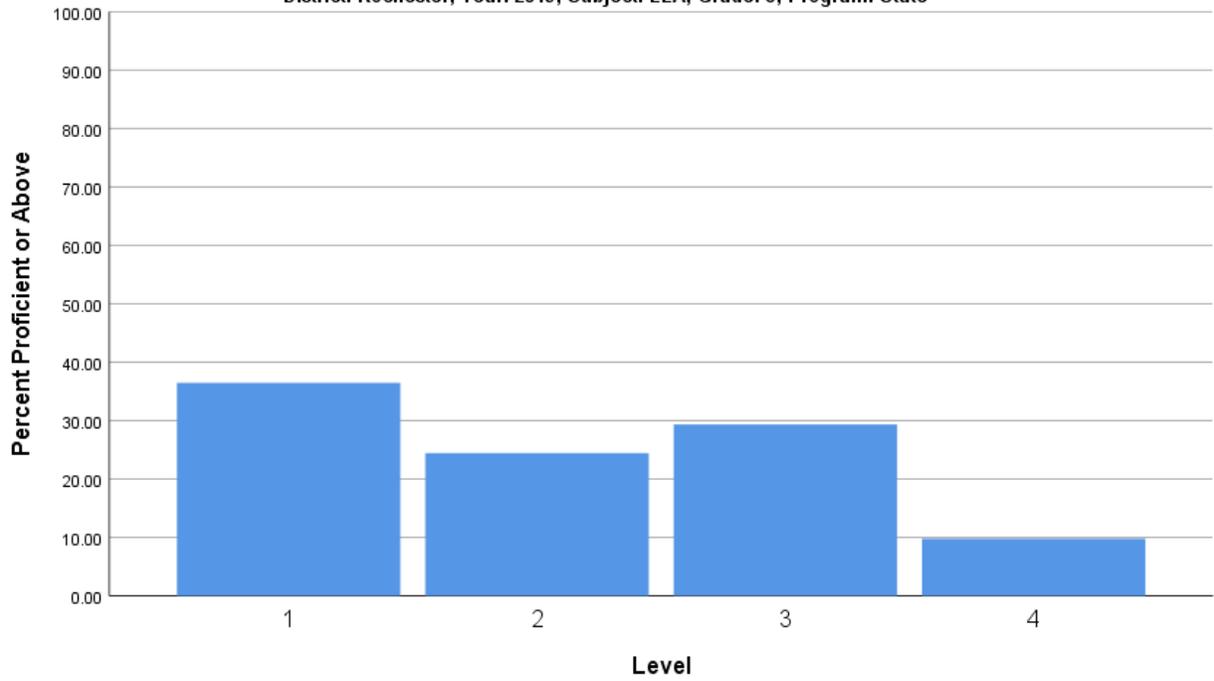




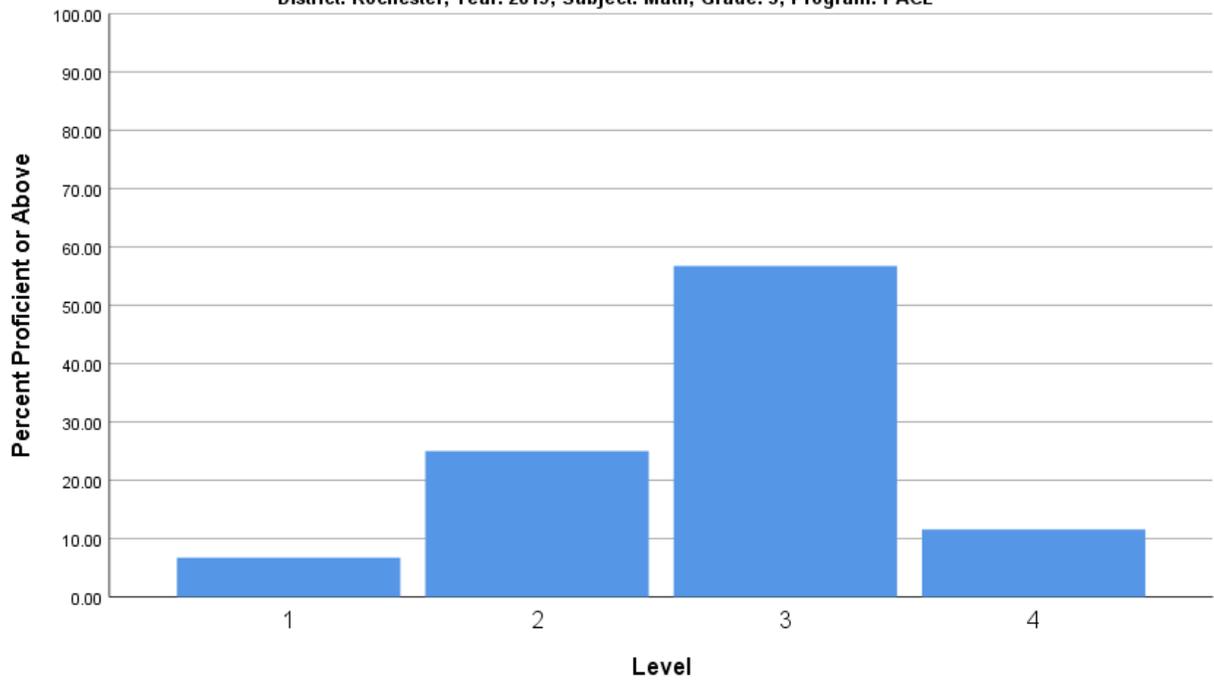
District: Rochester, Year: 2019, Subject: ELA, Grade: 7, Program: PACE

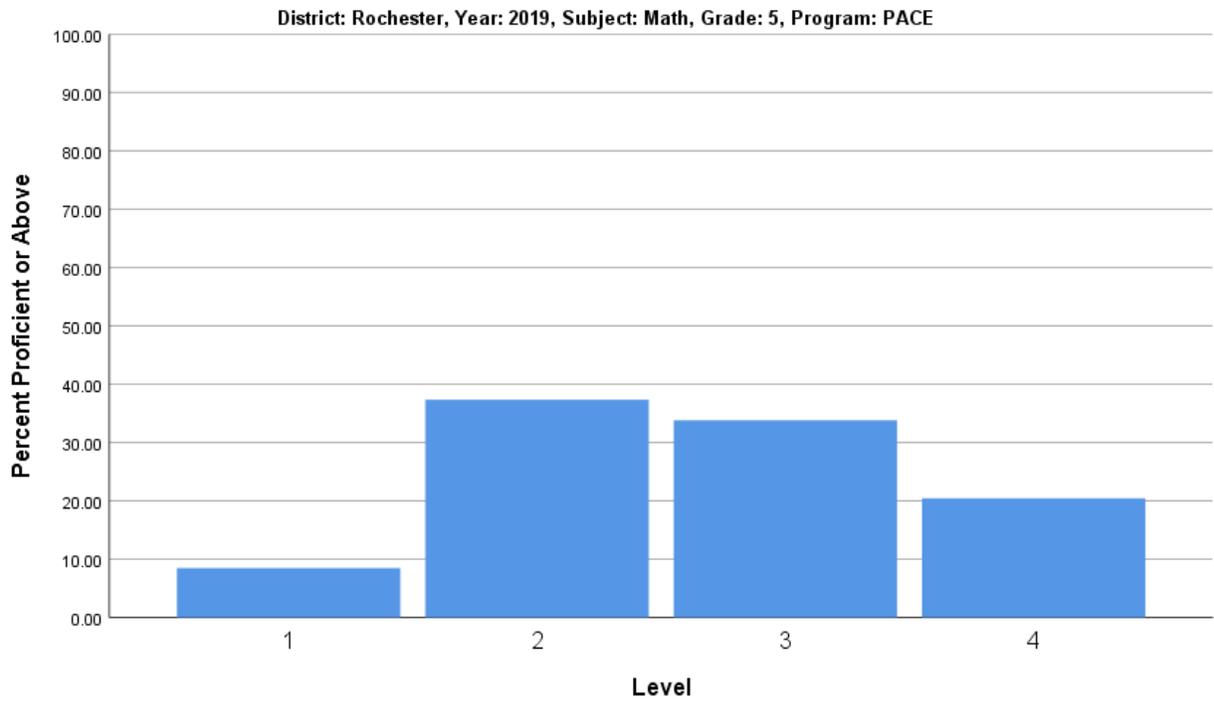
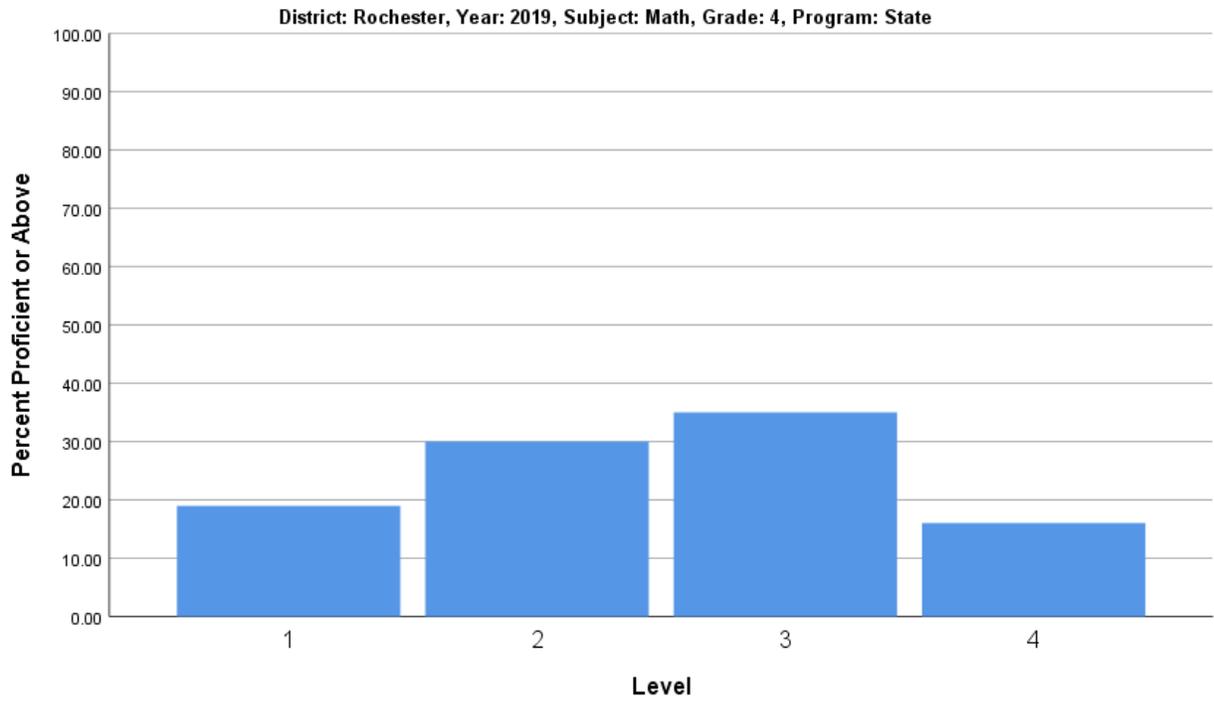


District: Rochester, Year: 2019, Subject: ELA, Grade: 8, Program: State

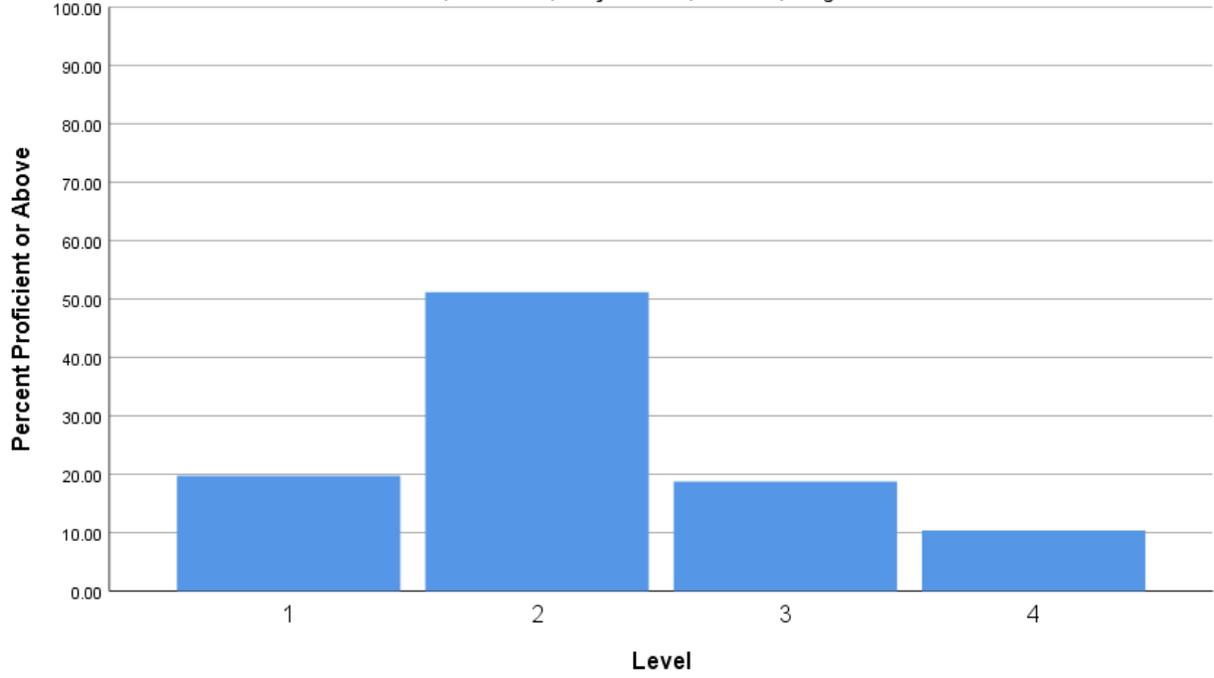


District: Rochester, Year: 2019, Subject: Math, Grade: 3, Program: PACE

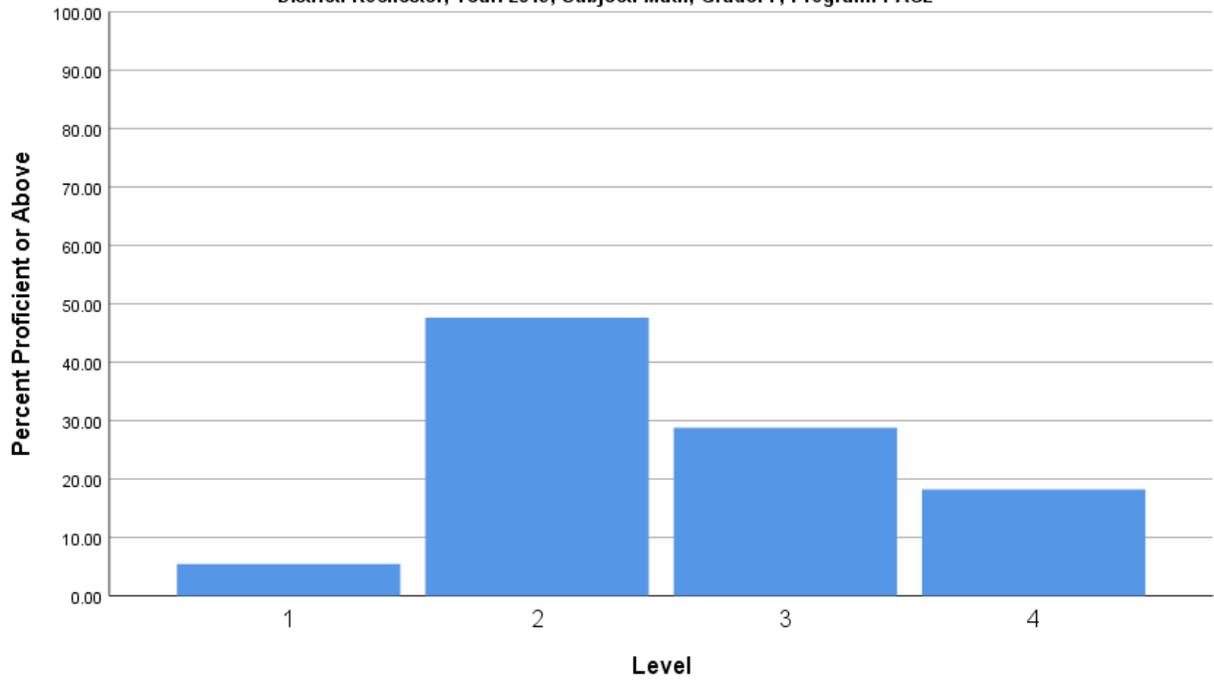




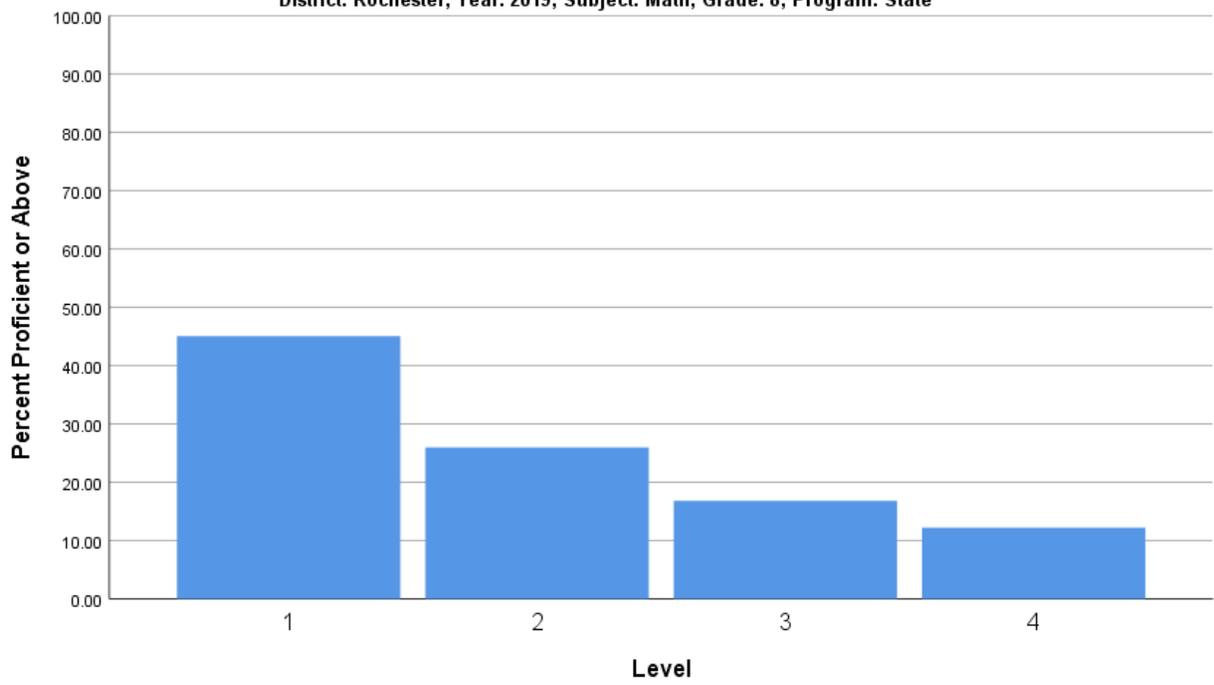
District: Rochester, Year: 2019, Subject: Math, Grade: 6, Program: PACE



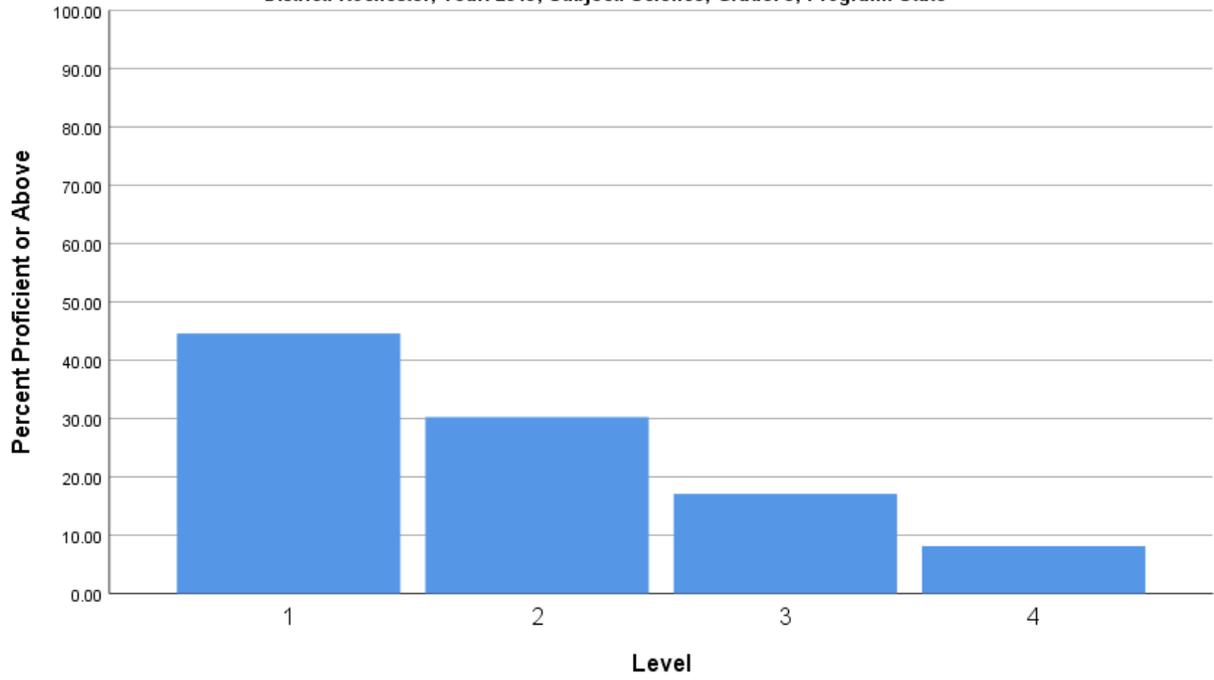
District: Rochester, Year: 2019, Subject: Math, Grade: 7, Program: PACE



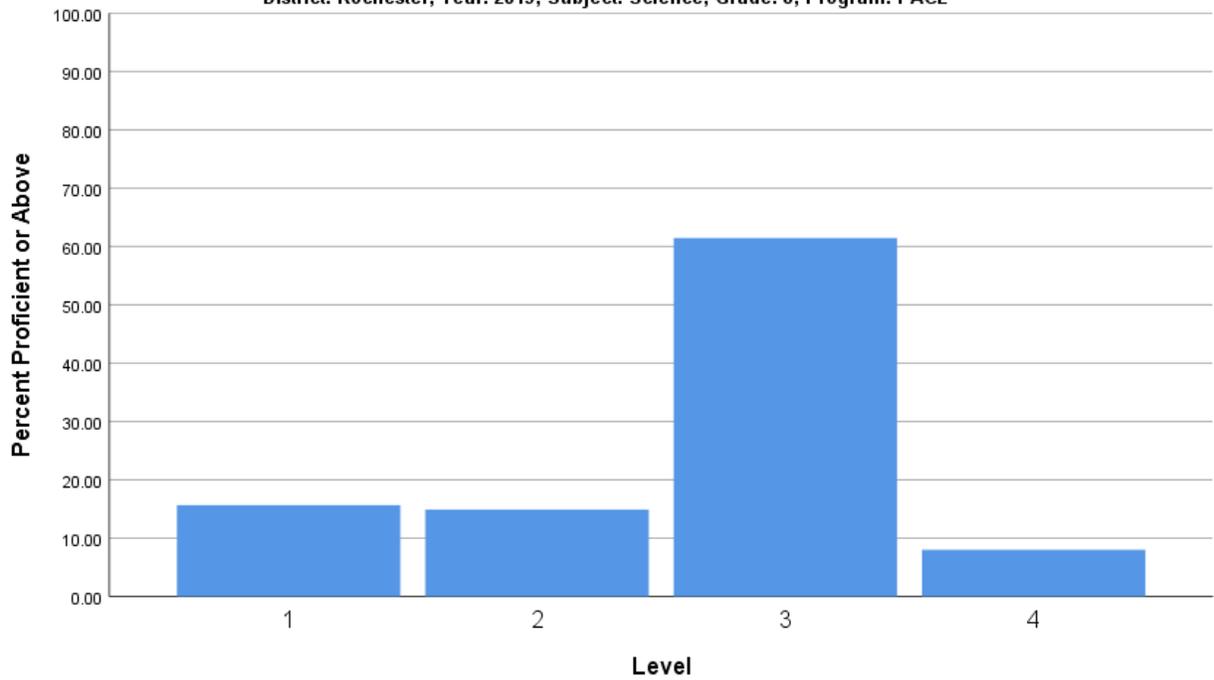
District: Rochester, Year: 2019, Subject: Math, Grade: 8, Program: State



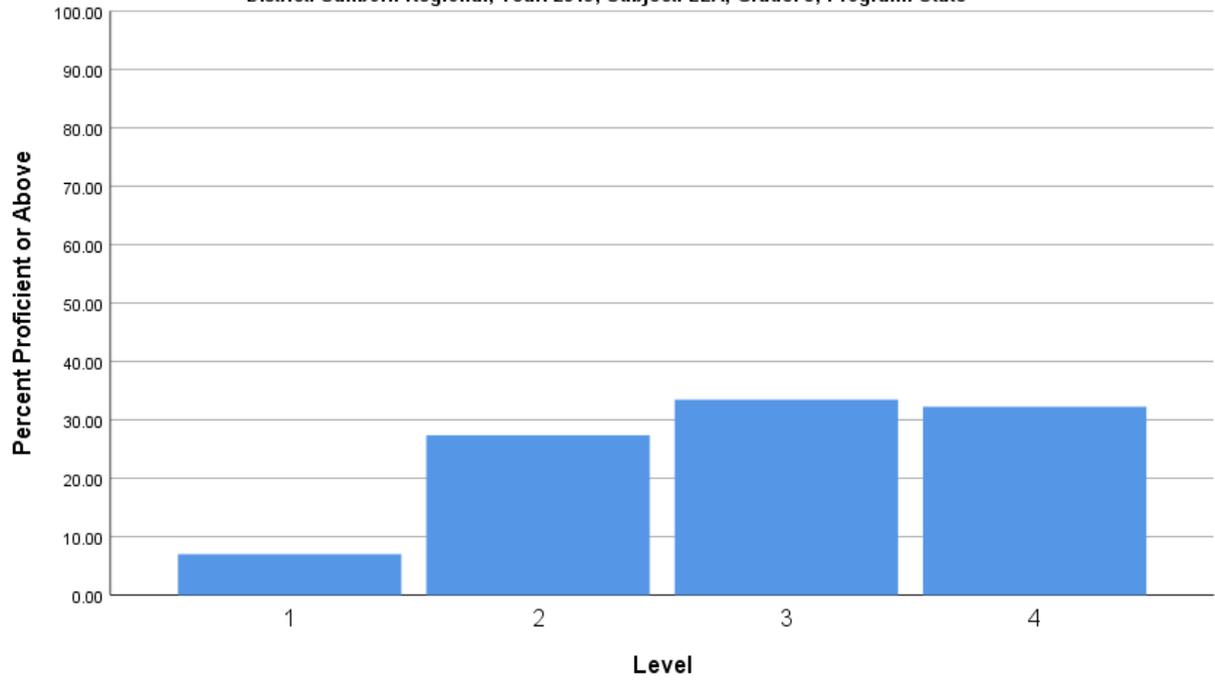
District: Rochester, Year: 2019, Subject: Science, Grade: 5, Program: State



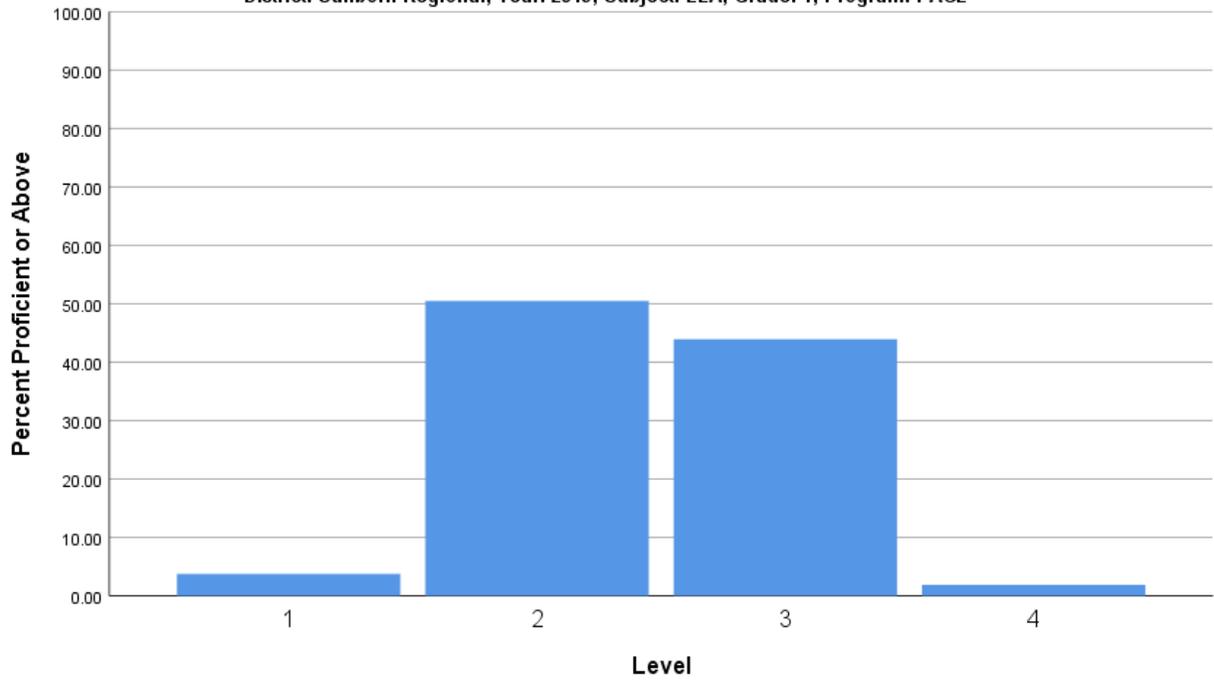
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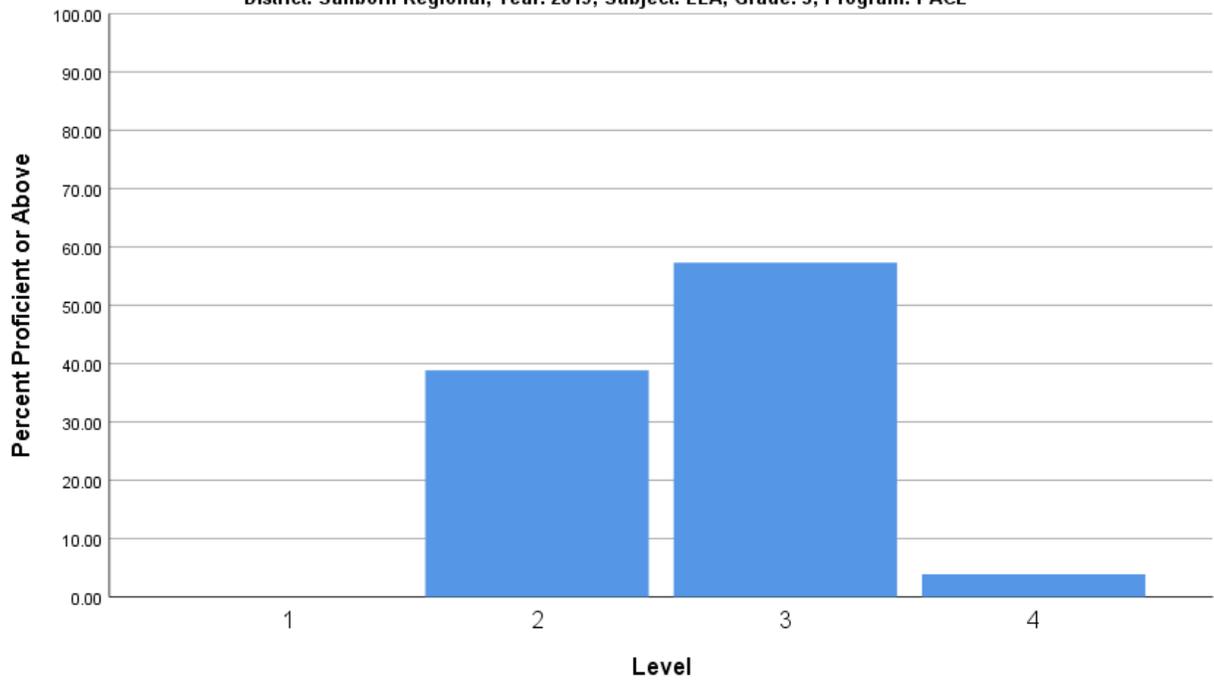
District: Sanborn Regional, Year: 2019, Subject: ELA, Grade: 3, Program: State



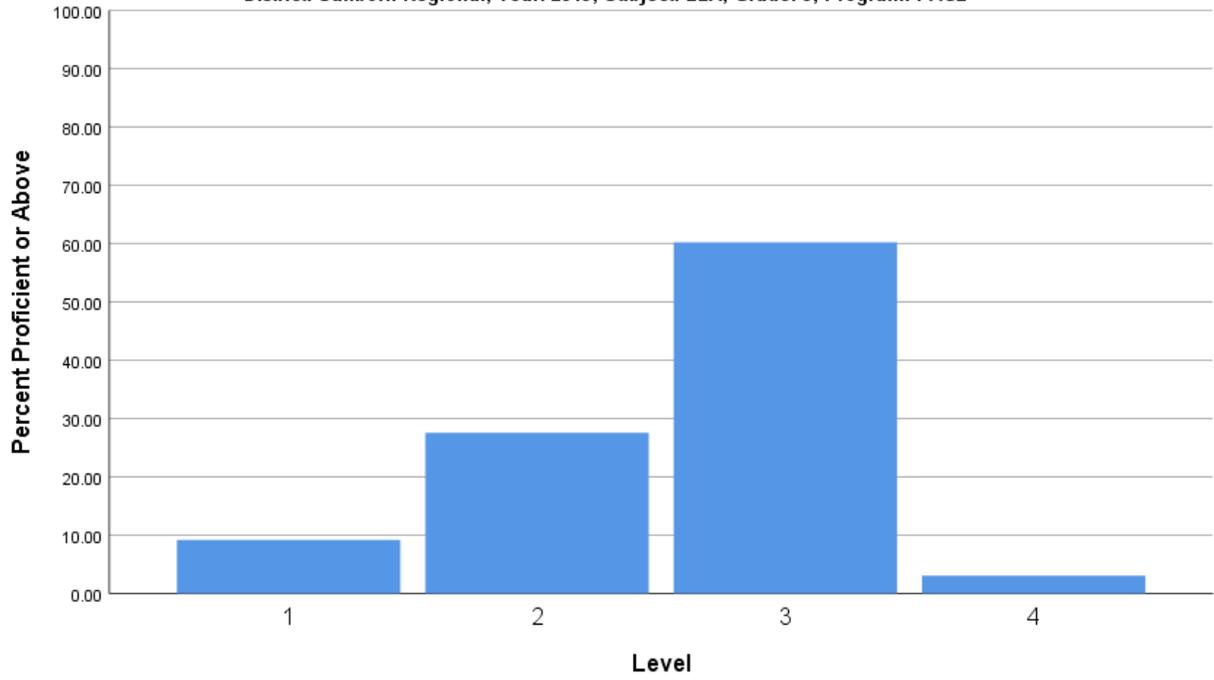
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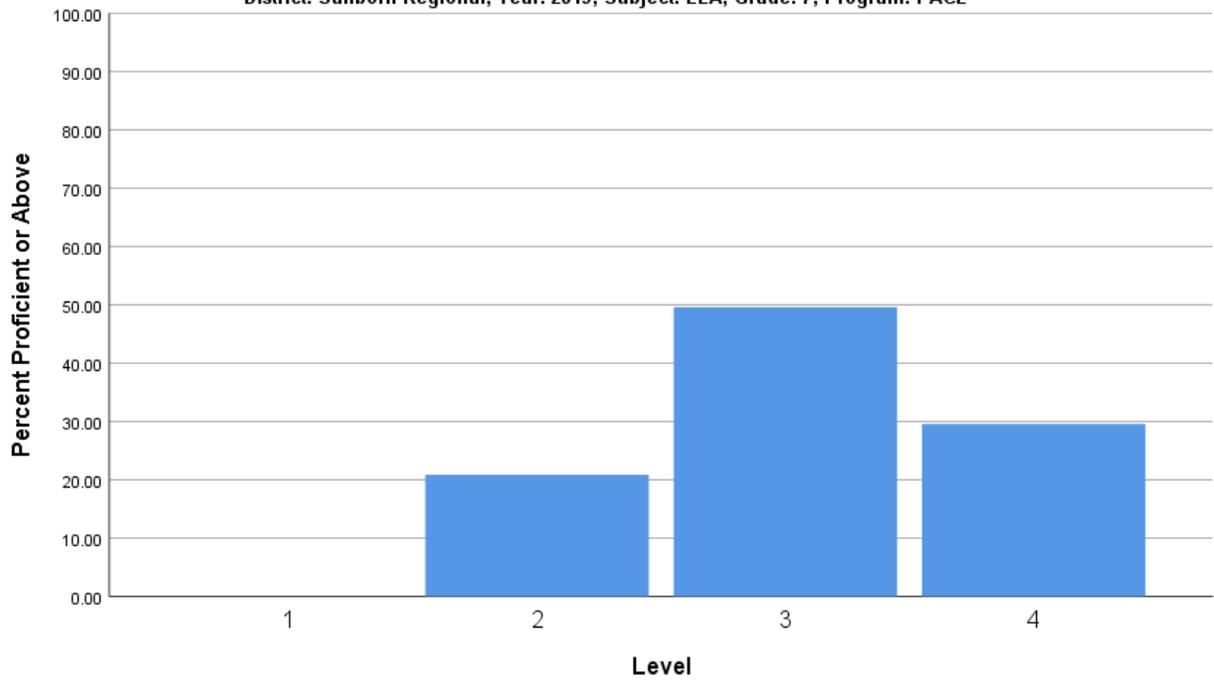
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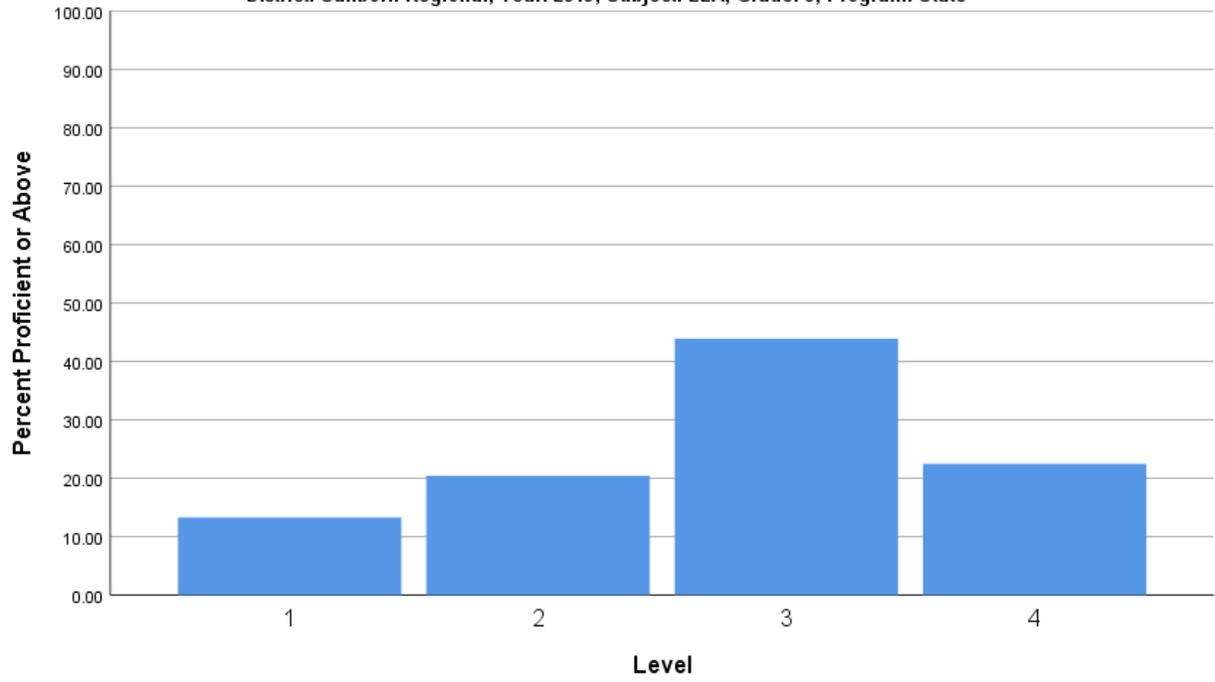
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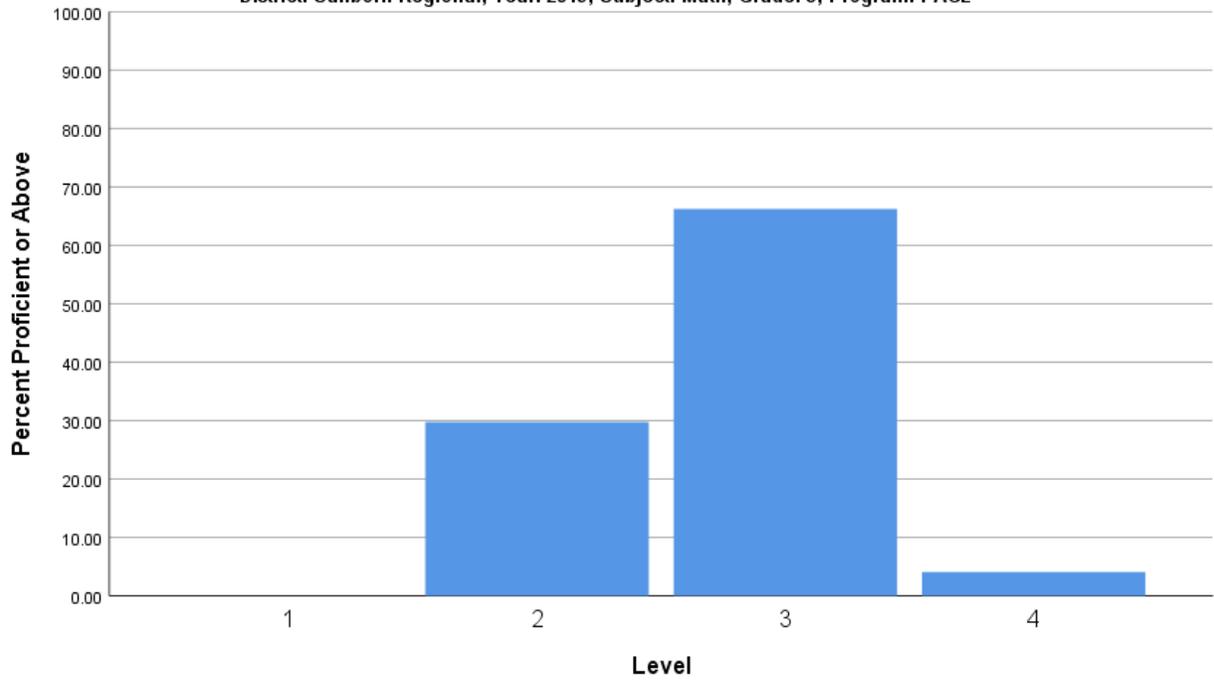
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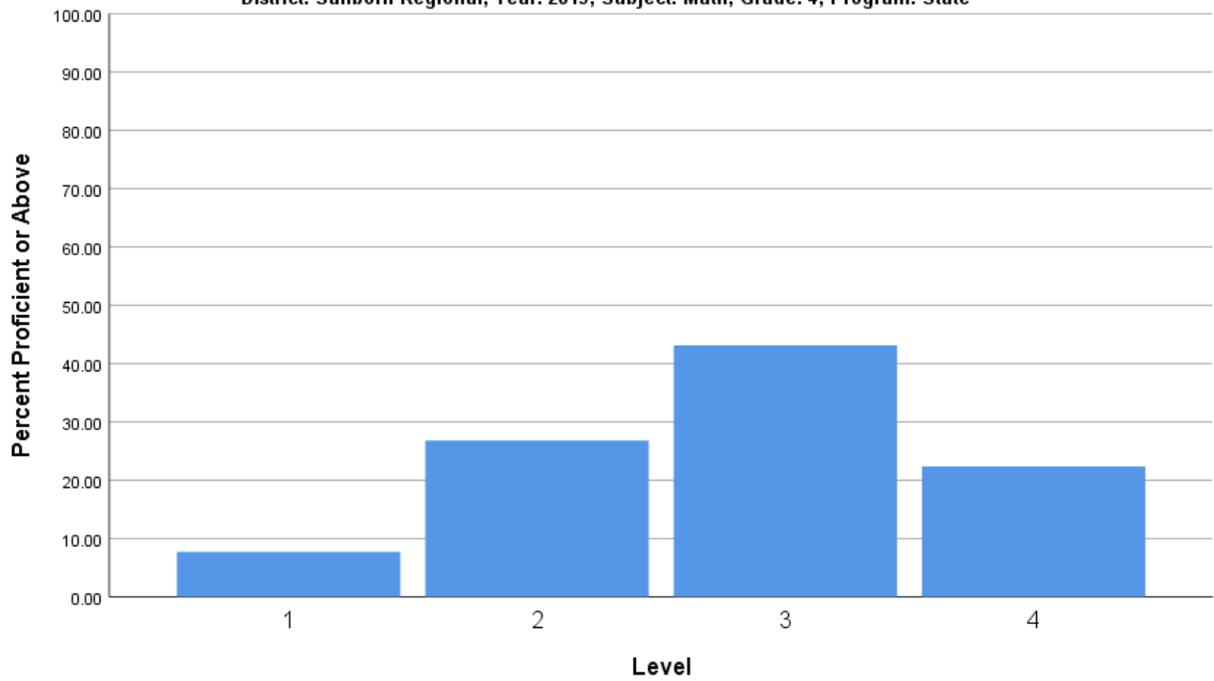
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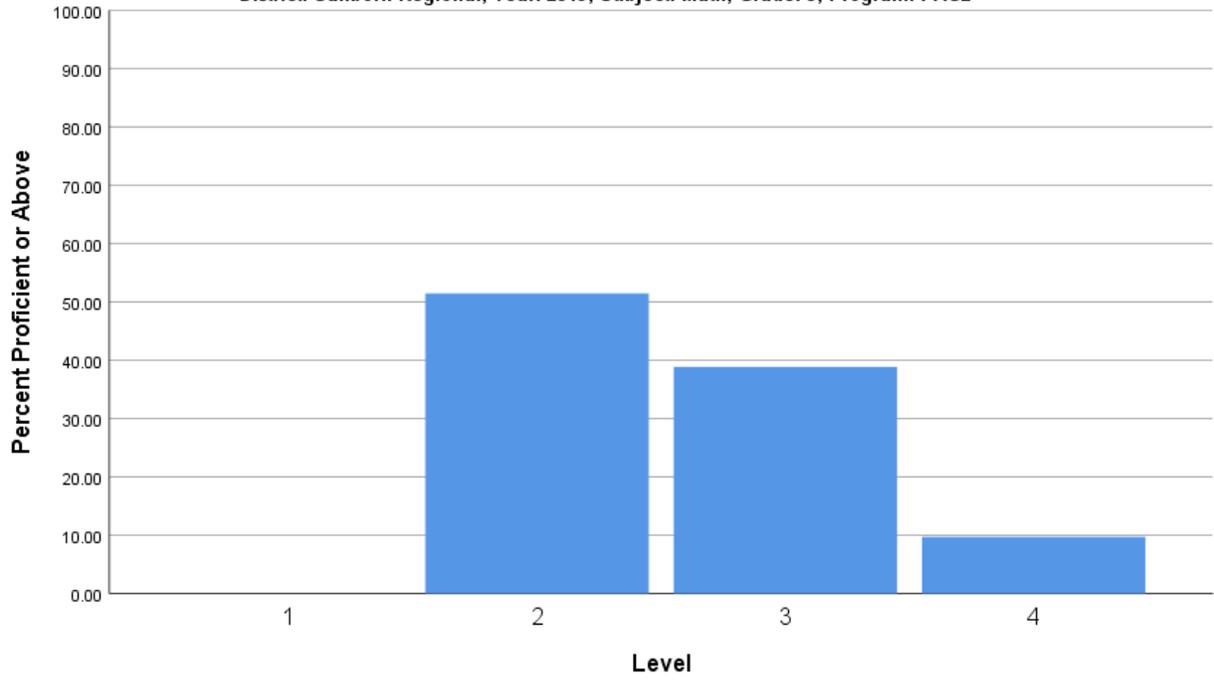
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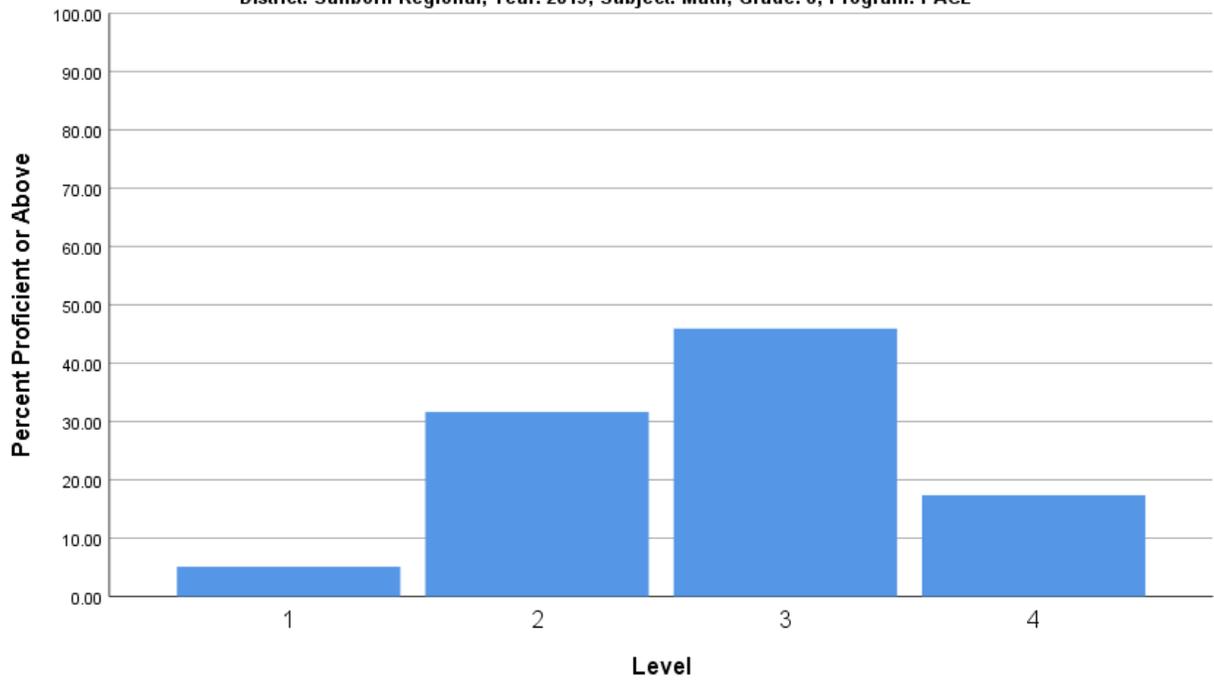
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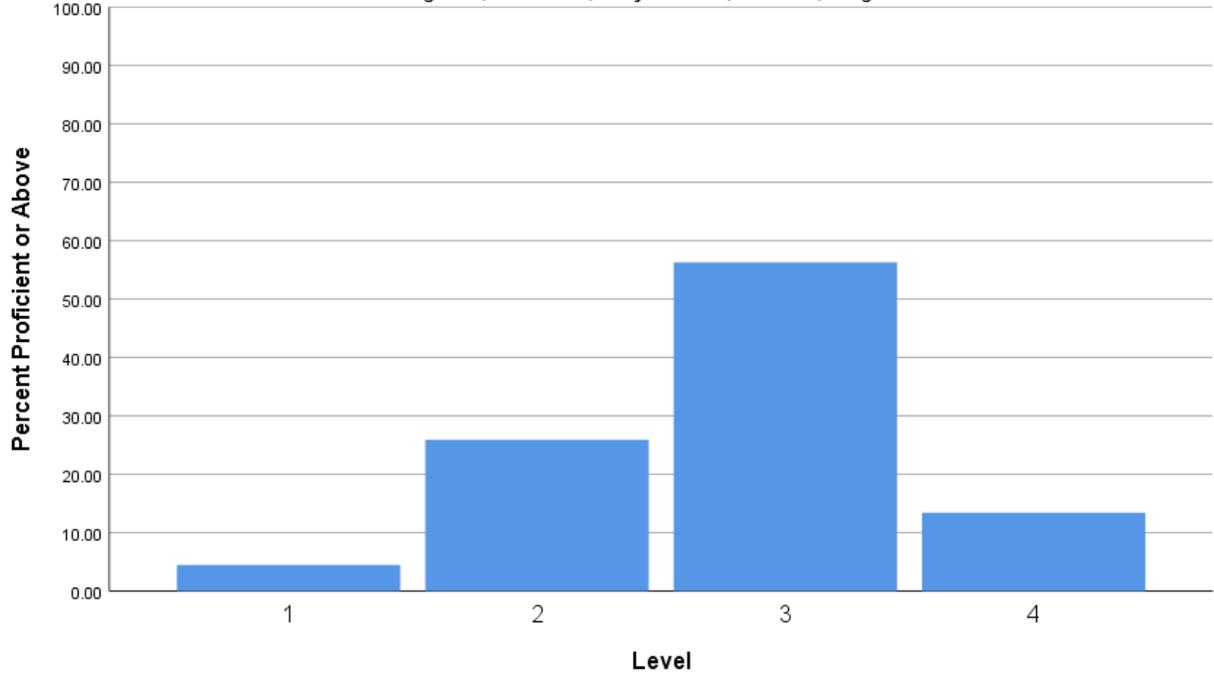
District: Sanborn Regional, Year: 2019, Subject: Math, Grade: 5, Program: PACE



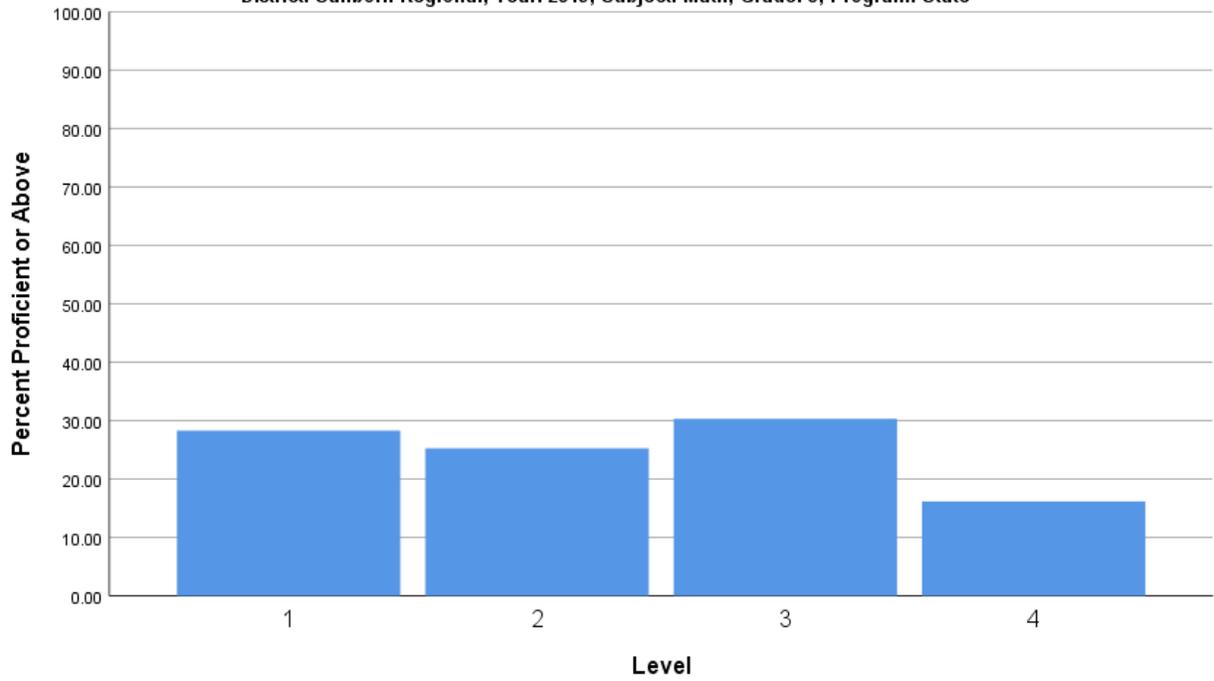
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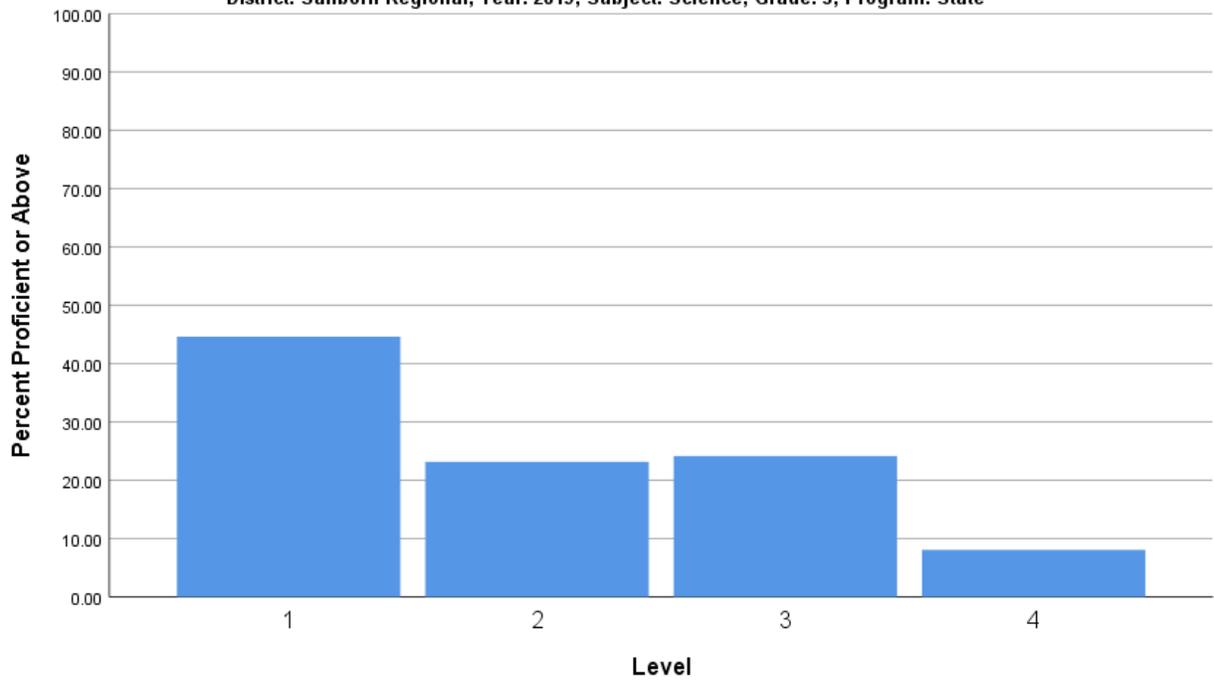
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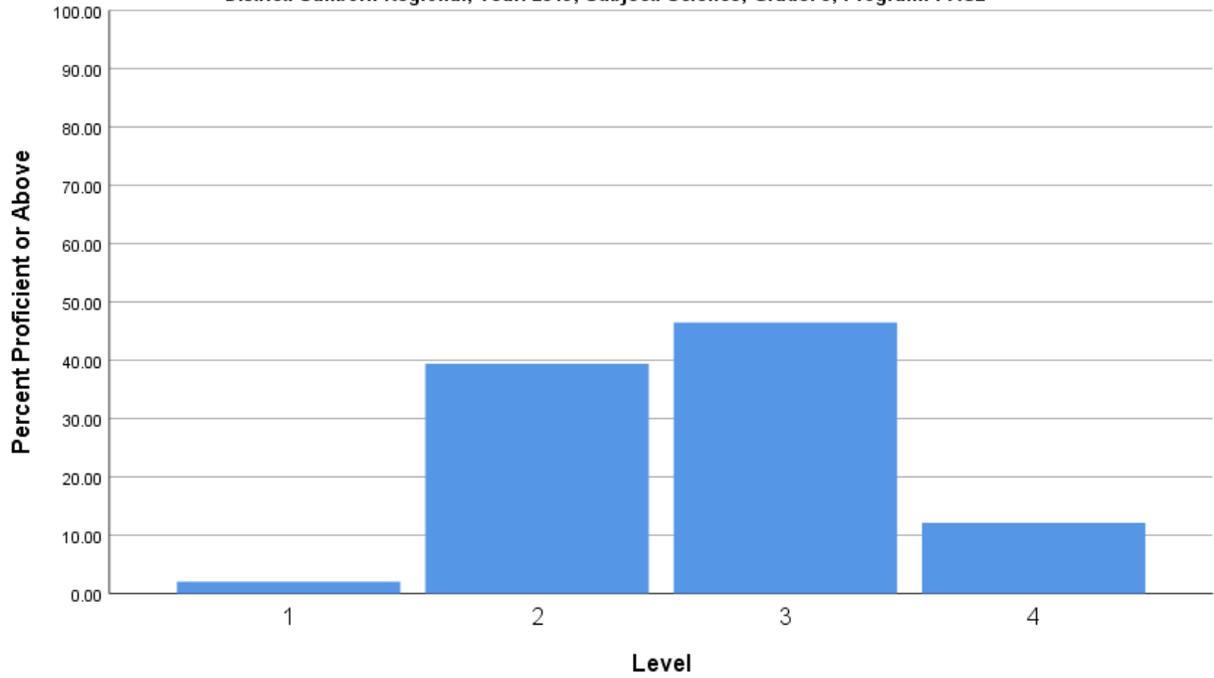
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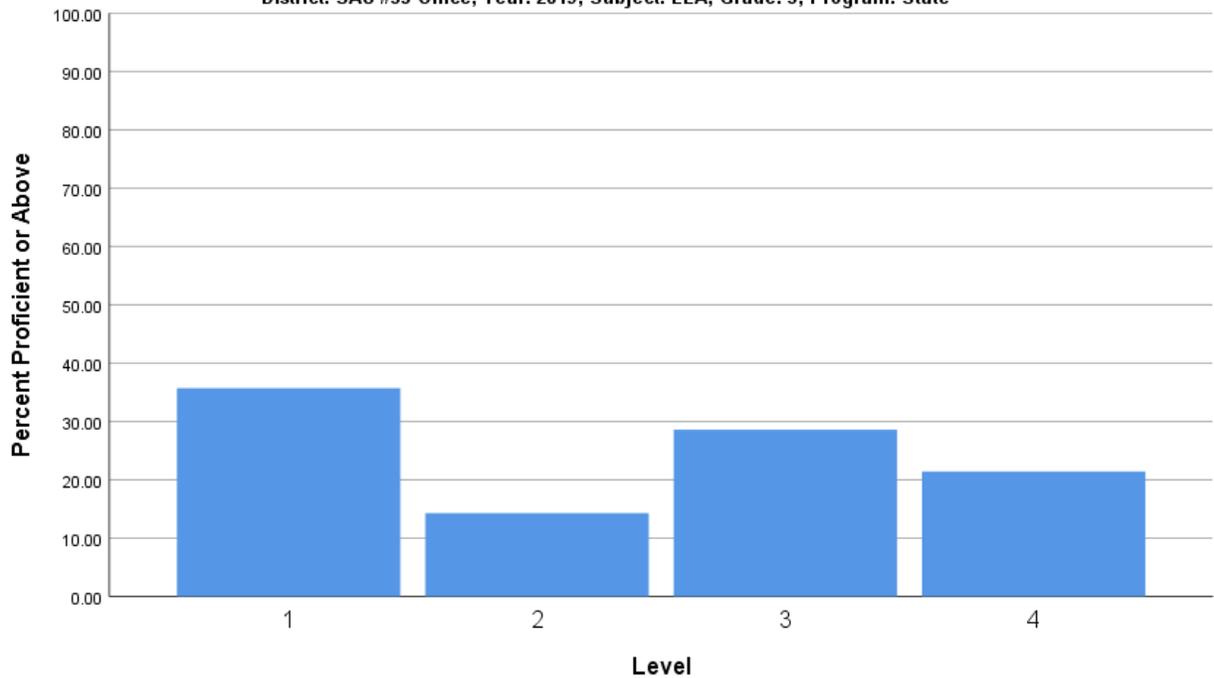
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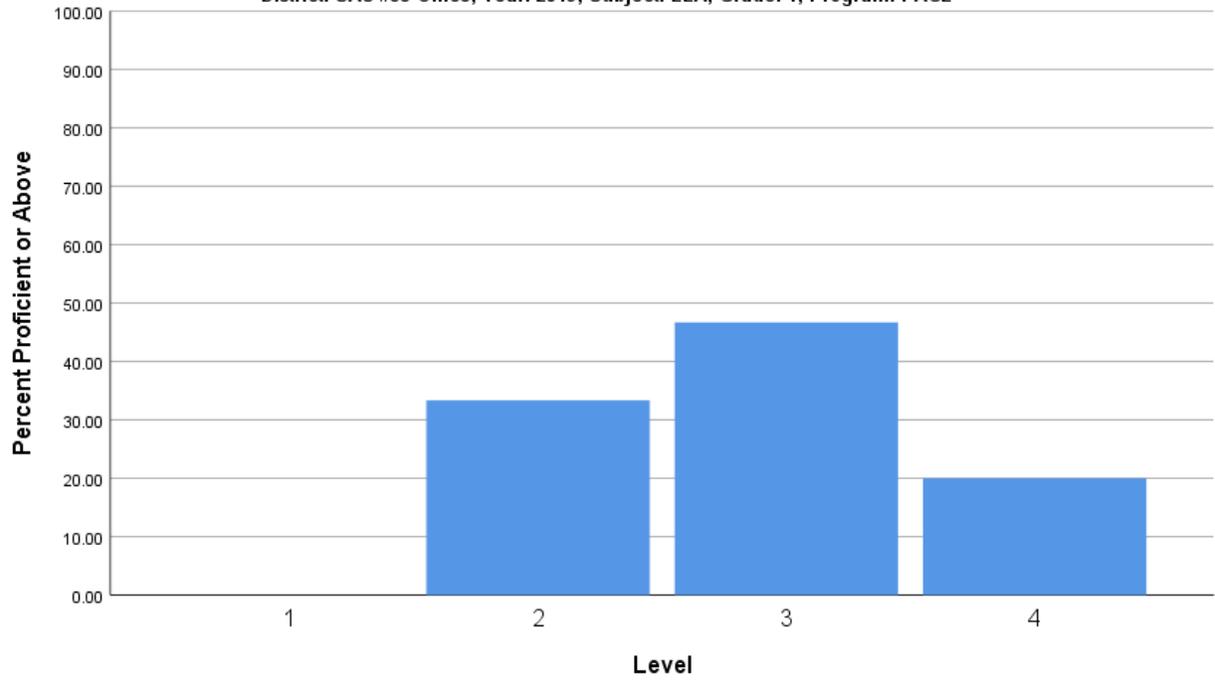
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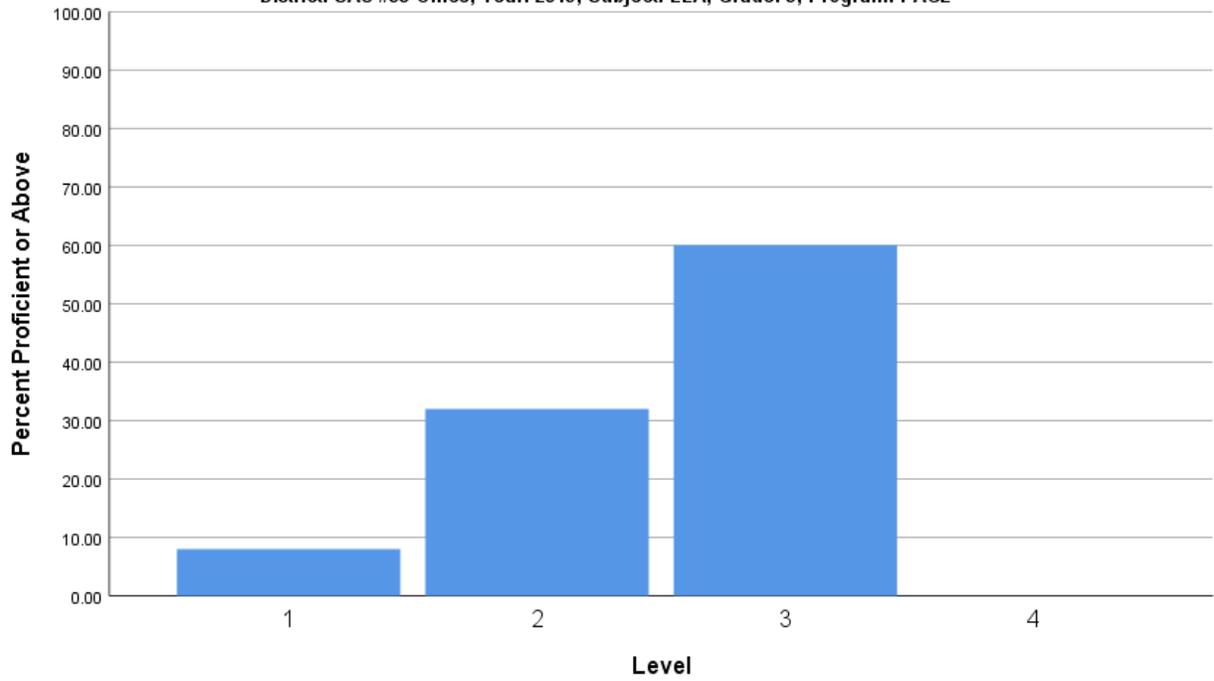
District: SAU #35 Office, Year: 2019, Subject: ELA, Grade: 3, Program: State



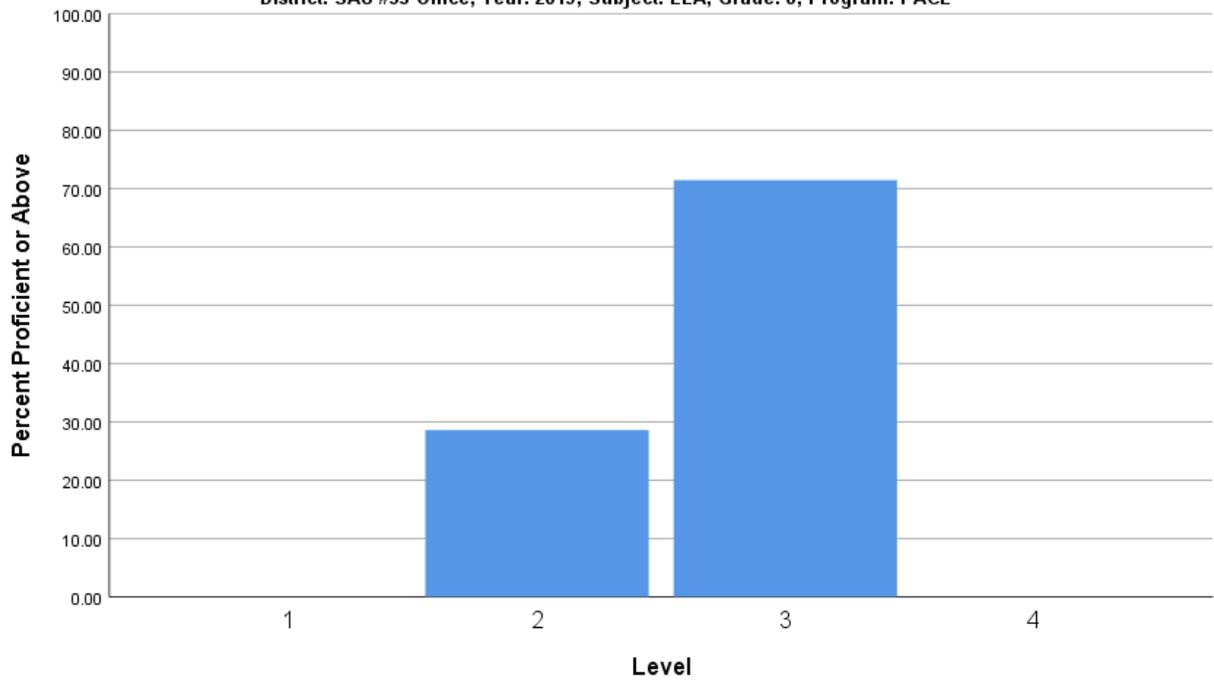
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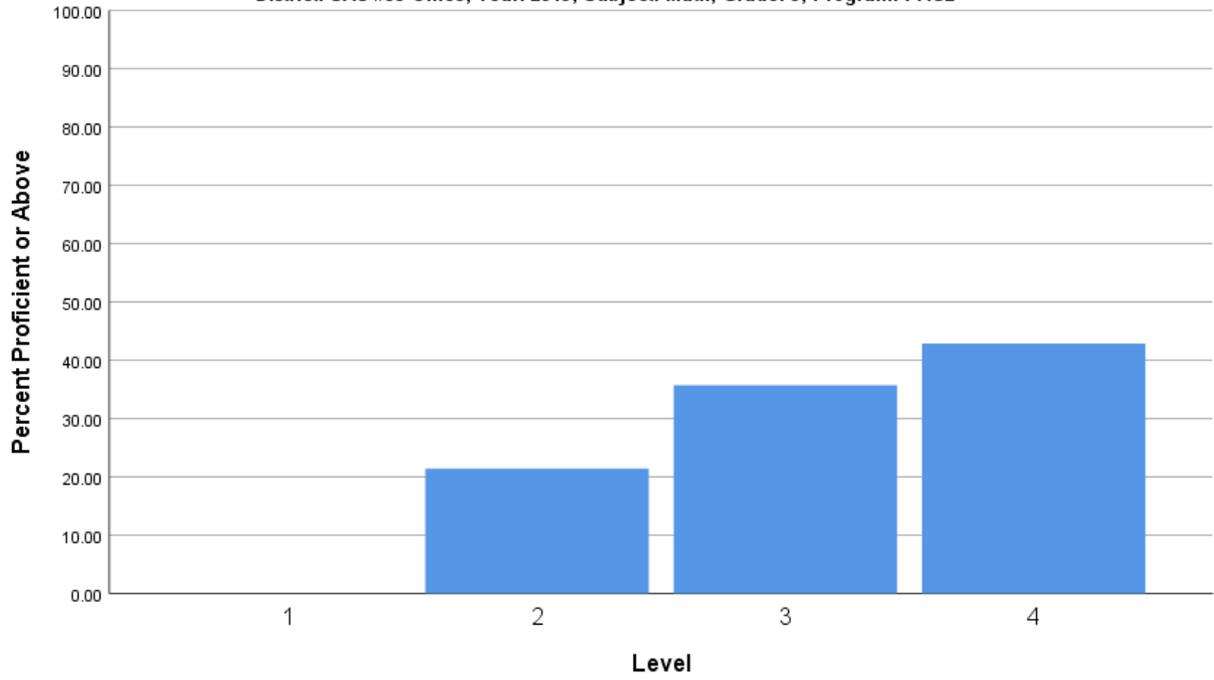
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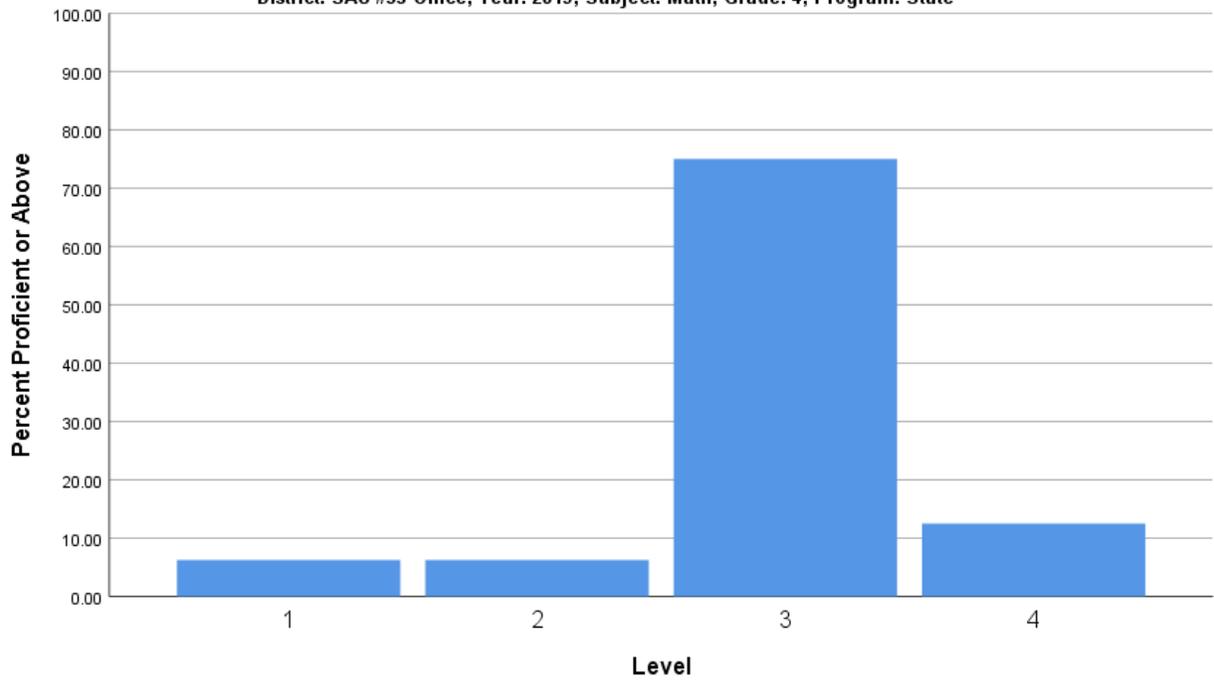
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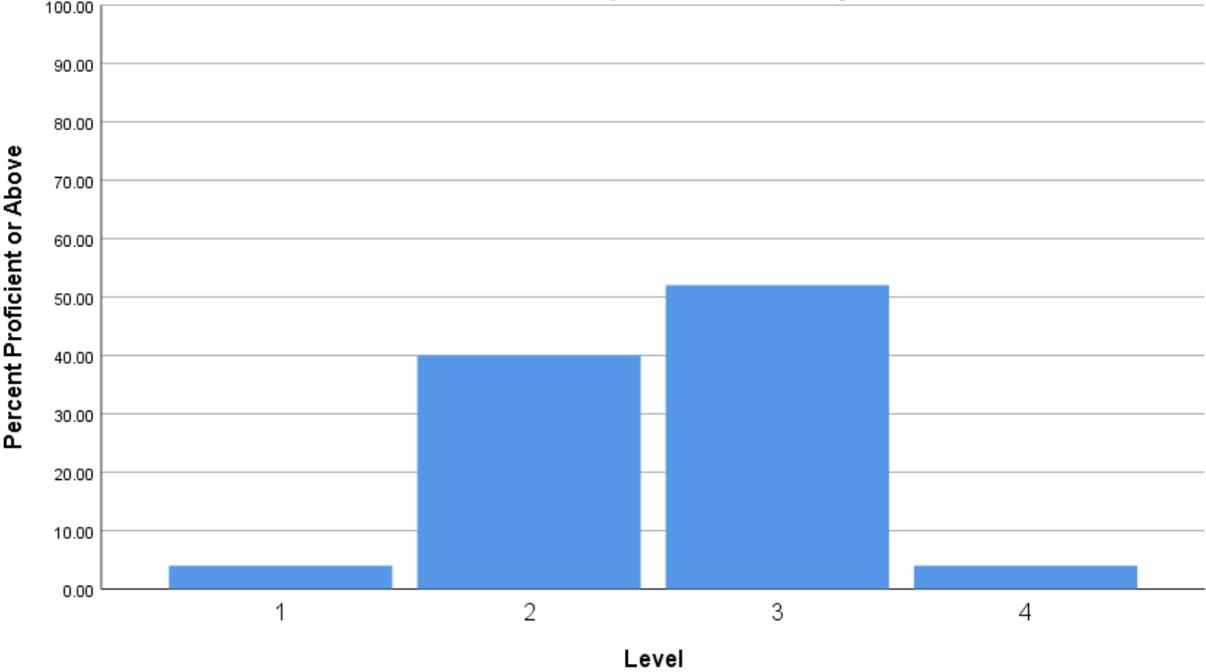
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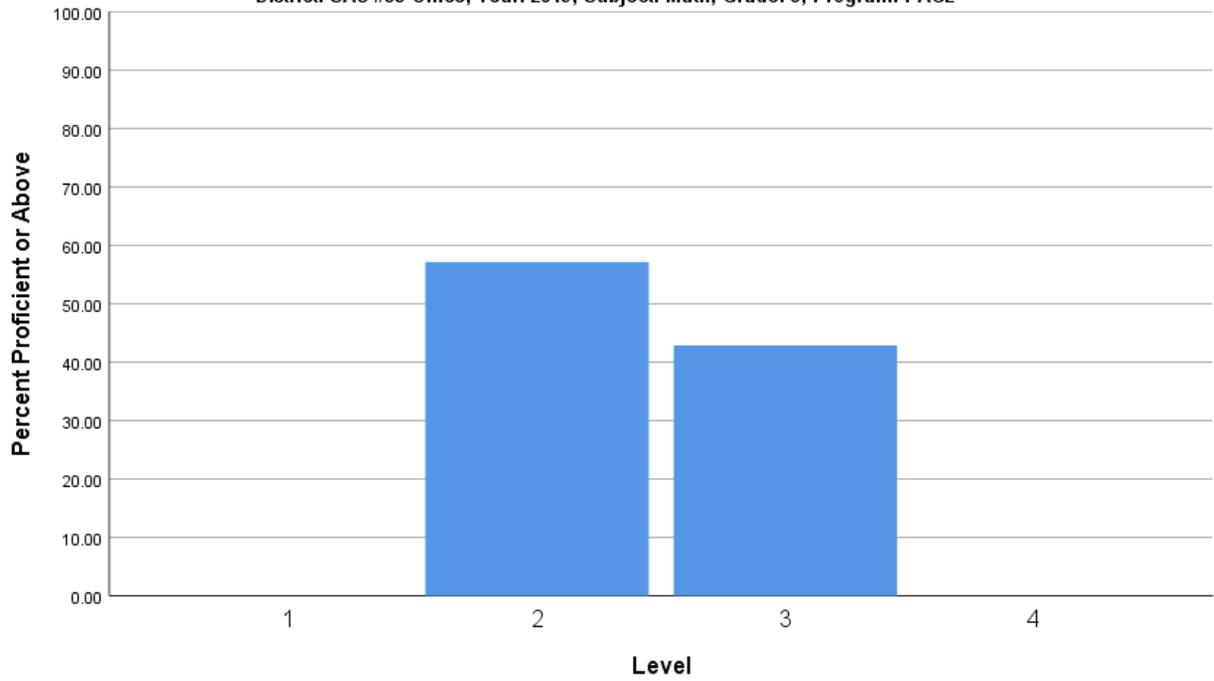
District: SAU #35 Office, Year: 2019, Subject: Math, Grade: 4, Program: State



District: SAU #35 Office, Year: 2019, Subject: Math, Grade: 5, Program: PACE



District: SAU #35 Office, Year: 2019, Subject: Math, Grade: 6, Program: PACE



District: SAU #35 Office, Year: 2019, Subject: Science, Grade: 5, Program: State

